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ABSTRACT

A report based on a conference on the impact of cost information on statewide budgeting and planning is presented. The conference was organized around case-study reports on the use of cost information in higher education budgeting in Florida, Indiana, Washington, and Wisconsin. Rather than publishing convention proceedings, the case studies were further investigated. Interviews were conducted with institutional staff, state postsecondary education agency staff, executive budget staff, and legislative staffs in each state, and available documentation on costing and budgeting was collected. Information gathered from these sources and from conference papers was put together to develop a case study of costing and budgeting in each state, with a particular focus on innovationand the requirements expected to characterize the environment for higher education in the 1980s. This report also contains a chapter by Harold L. Enarson on the uses and abuses of cost information. He cautions against overemphasis of the value of cost information. A second chapter by Frank B. Pesci provides an overview of the issues in statewide planning and appropriations processes and the relationship of cost information to these issues from the perspective of a state senator. The final chapter of the report presents the editors' views on cost-driven formulas and attempts to draw conclusions from the case studies. (SW)

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Cost Information and Formula Funding:

New Approaches

HE 012 290

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Cost Information and Formula Funding: New Approaches

Edited by
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Preface

Cost Information and Formula Funding: New Approaches derives from a conference sponsored by the American Council on Education (ACE), the Education Commission of the States (ECS), the National Association of College and University Business Officers (NACUBO), the National Center for Higher Education Management Systems (NCHEMS), and the State Higher Education Executive Officers (SHEEO) on 18-20 April 1979, at Arlington, Virginia. The conference concerned the impact of cost information on statewide budgeting and planning. The sponsoring organizations felt that the topic was important because of the implications that declining enrollments have for fiscal policies for postsecondary education. They felt that it was time to reflect on how cost information had been used and how it would be used in the future.

The conference was organized around case-study reports on the use of cost information in higher-education budgeting in Florida, Indiana, Washington, and Wisconsin. Among the many states that have gained much valuable experience with cost studies, those four were selected because they are representative and experienced users of cost information. Moreover, they have been innovators in the field, have established traditions of costing in their states, and have relied on cost information in making resource-allocation decisions.

It was immediately apparent that the case studies would interest a much wider audience than would be able to attend the conference. Rather than publishing a conventional proceedings, it was decided to further develop the case studies and publish them. To this end, the editors conducted interviews with institutional

staff, state postsecondary-education agency staff, executive budget staff, and legislative staffs in each state and collected available documentation on costing and budgeting. Information gathered from these sources and from the papers presented at the conference was put together to develop a case study of costing and budgeting in each state, with a particular focus on innovation and the requirements expected to characterize the environment for higher education in the 1980s. Whenever possible, we have used the words of those involved to describe the situation in each state. Thus we have drawn heavily on conference papers and official documents. Information elicited in interviews and during the question-and-answer periods at the conference has been included where appropriate.

In a document of this sort, many individuals made substantial contributions. We would particularly like to recognize those who prepared papers or made presentations at the conference:

- Florida—Tom Baker (Florida Department of Education), Lester Brookner (Miami-Dade Community College), and Ed Cisek (formerly Senate Ways and Means Committee staff)
- Indiana—Bill Gleason and George Weathersby (Indiana Commission for Higher Education) and John Hicks and Howard Lyon (Purdue University)
- Washington—Denis Curry (Council on Postsecondary Education), Robert Thompson (University of Washington), and Harold Jacobsen (State Board for Community College Education)
- Wisconsin—Elwin Cammack (University of Wisconsin System), Brian Roherty (State Budget Office), and Charles E. Bauer (University of Wisconsin-Eau Claire)

In addition, the keynote speakers—Harold Enarson (Ohio State University) and Frank Pesci (Maryland House of Delegates)—contributed greatly to the conference and we have included the texts of their talks.

We would also like to express our appreciation to those who gave freely of their time for interviews:

- Florida—Charlie Reed, Tom Furlong, and Tom Hanna (Postsecondary Education Commission), and Rod Willis and Katie Tucker (Bureau of the Budget)
- Indiana—Dave Rihm (Budget Office) and Tom Kinghorn (Ball State University)
- Washington—Norm Fischer (Council on Postsecondary Education) and Jim Martin and Don Meyer (House Appropriations Committee Staff)
- Wisconsin—Judith Ward and Tom Fletemeyer (Legislative Fiscal Bureau), Gene Arnn, Gene Craven, Reuben Lorenz, and Kent Hill (University of Wisconsin System), and Glen Watts and Martha Casey (University of Wisconsin-Madison)

Finally, we thank Sheila Sanjabi of the NACUBO staff for a well-run conference, Bill Johnston and Mary Sue Waldkirch of the NCHEMS staff and Jeffrey Sheppard of the NACUBO staff for editorial assistance, and Rebecca Shanks and Lorraine Hori of the NCHEMS staff for preparing the manuscript.

Introduction

Formula budgeting has become common in American postsecondary education. Gross (1974) found that 25 states use some kind of formula. The Michigan Department of Education (1976) learned that almost every state is using some kind of quantitative approach to link funding to enrollment levels. The evolutionary success of formulas or similar approaches in budgeting for postsecondary education can be attributed to a number of factors. According to Miller (1964), the advantages of formulas are: (1) facilitation of analysis and information provision; (2) facilitation of interinstitutional comparisons; (3) contribution to equity in the funding of institutions; (4) contribution to adequacy in institutional funding by allowing requests to be made in a simple, systematic, and apparently irrefutable way; and (5) facilitation of the highlighting of important policy questions. These advantages have led to the widespread use of formulas despite a number of reservations about them. Among the more important reservations identified in the literature are (1) difficulties with quantification and objective analysis peculiar to higher education (Rourke and Brooks 1966); (2) failure to include quality as a variable (Dressel and Fancy 1972); (3) rigidity (Cope 1968); (4) overemphasis on classroom instruction at the expense of other functions (Hobbs 1970); and (5) the tendency to lead to outside control of management of the institution (Glenny 1959).

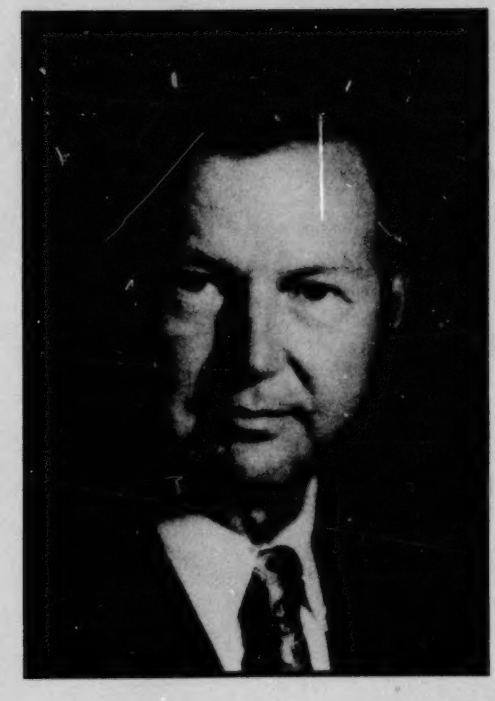
As it has become increasingly probable that enrollments will decline through the 1980s, by as much as 25 to 30 percent in some states, the potential negative impact of formulas in this kind of environment has become a major concern. This concern arises from the fact that almost all budget formulas are based largely or entirely on average costs (so many dollars per student). These formulas may be based on historical average costs as determined by a cost study, or they may be based on normative average costs (or workload factors) as determined by a negotiation process. They may be simple (x dollars per FTE student), or they may be complex (with many discipline and level categories of students and with many institutional functions and types of institutions represented). All, however, relate budgets to enrollment levels. It has long been recognized that in higher education, like most other enterprises, actual costs do not behave in such straightforward fashion. Rather, costs respond in a variety of ways to volume changes, as well as to environmental and policy changes (Robinson, Ray, and Tuck 1977).

When enrollments were increasing rapidly, many institutions found that average-cost formulas worked to their advantage. The formulas generated additional funds that could be used to increase the quality of existing programs, as well as to develop new programs and reach new clienteles. This was possible because the costs of adding new students in *existing* programs did not rise proportionately with increases in enrollments. Unfortunately, the inverse is also true. When enrollments decline, overall costs will not decline proportionately. Therefore if formulas reduce institutional revenue on a per-student basis, institutions may be forced to reduce quality, drop programs, and restrict clientele.

While it can be argued that some of these reductions may be appropriate, few would suggest that such reductions should happen accidentally, as an unexamined and unanticipated consequence of a mathematical formula. The challenge then is to develop an approach to budgeting that will preserve the advantages of a formula while not affecting the base programs of an institution in arbitrary and unintended ways. If this is to happen, the reductions of costs attributable to reductions in enrollment levels need to be looked at separately from potential cost reductions resulting from program reductions or other policy decisions. In this way, formulas can be adapted to the environment of the 1980s without doing unintended harm to institutional capacity to meet the needs of students. The effort to develop new formulas is, of course, not the only possible response to the problem. A variety of other methods, each with their own strengths and weaknesses, for budgeting for postsecondary education could be used.

This document examines the links between costing and budgeting. The first two chapters present two interestingly contrasted perspectives on cost information and budgeting. Harold Enarson, President of Ohio State University, cautions against overemphasis of the value of cost information. Frank Pesci, of the Maryland State House of Delegates, describes the legislative view of budgeting for higher

education. Next are the case studies of costing and budgeting in Florida, Indiana, Washington, and Wisconsin, all of which emphasize innovation to meet the challenges of the 1980s. The final chapter presents the editors' views on cost-driven formulas and attempts to draw conclusions from the case studies.



President of the Ohio State University since 1972, **Harold L. Enarson** has also served as chief executive of Cleveland State University and as Academic Vice President of the University of New Mexico. Dr. Enarson has a distinguished record in public service, particularly in the fields of higher education, international education, and health sciences. He served on the NCHEMS Board of Directors from 1976 through July 1979.

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The Uses and Abuses of Cost Information

Harold L. Enarson

Harold MacMillan once described a British foreign secretary as "forever poised between a cliché and an indiscretion." So it is with university presidents, oscillating between the clichés of commencement talk and the indiscretions of conversation over drinks with colleagues. Yet some consideration of both clichés and indiscretions is necessary in looking at the use of cost information in statewide planning.

A Common View

Members of state coordinating boards and the governors and legislators who set them up share a set of assumptions about colleges and universities. Conventional wisdom has it that colleges and universities:

- are self-centered and preoccupied with self-preservation;
- never have enough of anything (money for salaries, books, equipment . . .);
- are highly competitive and jealous of each other's achievements;
- tend to be captive of their internal constituencies, often to the neglect of the needs of new, weak constituencies;
- are profoundly imitative and upwardly mobile (colleges press to become regional universities, major universities press for the full range of graduate programs, and the goal is to be a "flagship" university); and

- are enamored with prestige, the educational equivalent of profit, with the number of grants that can be secured serving as the entrepreneurial test.

As cliché has it, the results are wasteful diplication, unhealthy rivalry, and poor use of scarce resources. Because the public clearly deserves protection from these piranhas, wise political leadership establishes state coordinating boards. (Such boards start innocently with the collection of information but move inexorably toward greater control. For each expert employed by state government, institutions are forced, in self-defense, to employ experts. Estimates vary from a 1:20 to a 1:3 job creation factor.)

The goals of state coordinating boards are evident:

- coordinating instead of competing,
- sharing resources rather than duplicating them,
- keeping costs at reasonable levels,
- accounting for expenditures,
- managing resources wisely, and
- assuring equity among similar programs in various institutions.

Put simply, the ideal is that the Wasteland Branch of Outreach University earns the same amount of dollars for an FTE in a master's program in history as does Flagship University for the "identical program."

The legislature is seen as the injured party, soberly preoccupied only with economy, efficiency, and accountability. In this view, there is no hint that our colleges and universities are "smokeless industries," propping up the local economy, and that legislators have an abiding interest in what happens to *their* institution in *their* district.

Use of Cost Data

Against this backdrop of mingled reality and fantasy, one must examine how cost information is used—and abused. Briefly, cost data are the historical record of how much is spent for any given set of activities. The purposes of cost data are:

- to afford a factual basis on which university presidents, budget officers, legislators, and others can operate, thus substituting facts for rhetoric;
- to encourage and facilitate interinstitutional comparisons to achieve equity;
- to establish the factual basis of "price"—as, for example, the "price" of teaching, in view of the fact that the charge to students is not the "price"; and
- to serve educational managers for internal use in resource allocation.

The uses and limitations of cost information are hardly new issues; a great deal of attenton has been focused on unit costs and cost comparisons. In the United States, the "units" typically have been students or student credit hours.

Administrators have assumed that these units were appropriate and useful; indeed, they served well in a period of growth. Unit costs became the building blocks for formulas that provided fair measurements of enrollment growth. Defining "the student" as a unit presumably provided a simple measure by which funding levels for a given college or university could be determined. Using "the student" as a cost object also presumably enables state boards and legislators to assure equity in appropriations between competing state institutions.

How useful has this type of familiar unit cost information been for internal management? Each year in colleges and universities, mountains of computer printouts have been generated, collected, assembled—and shelved. The rapid expansion of management information systems for planning and management in higher education has provided a bewildering array of computer software packages touted as the means to convert higher education from intuitive and political decisionmaking to rational planning. This boom period has provided employment opportunities for untold numbers of persons in departments of higher education and public administration, consulting firms, and university planning and institutional research offices. It has been accompanied by the development of a language so esoteric that chief administrative officers must attend periodic conferences so that they can communicate with the technical people they have hired. Acronyms, such as HEPS, NCHEMS, RRPM, ICLM, HEGIS, and HELIX, have flourished.

Despite the wide acceptance of this tool of management, many presidents and academic vice-presidents would agree that knowledge of staff members' qualifications and work, class sizes, equipment, and other facilities should suffice in budget considerations. Skepticism about the usefulness of student unit-cost data extends from internal administration to external use by state controlling boards and state officials. As most public institutions face, at best, near-stability (more typically, serious enrollment declines), the traditional student unit-cost data appear to serve poorly. To use such data as the major building blocks for determining appropriation levels is to ignore reality and invite indefensible and intolerable cuts.

Consider the hypothetical example of Wetlands University, with its 20,000 FTE students. The most sanguine projections indicate a probable decline from 20,000 to 15,000 FTE in five to eight years. With fewer students, Wetlands University must cut back on its faculty. Unit-cost data would suggest that an exactly proportional cut be made: if enrollment is down 25 percent, then faculty staffing must be down by 25 percent. But can such a reduction be made without crippling the institution? The freshman government lecture with 100 students will now have only 75 students, but the class still requires one instructor—and a lecture hall that must be heated, lighted, and cleaned. Fewer faculty will be required, but—and this is the central point—the decrease in faculty ought not be directly proportional to the decrease in enrollment.

The same factors are at work as Wetlands University reviews its support structures. Electricity, gas, water, energy, library, computer center, security force, and buildings and grounds staff all can and must endure some cutback. But to require directly proportional reductions would be disastrous.

Needed: A New Approach

Simple course-enrollment counts of our customers can no longer serve as the basis for calculating and determining the dollar needs of institutions. A different approach is required, one that recognizes the clear need for cutbacks while at the same time dealing with the realities of the educational enterprise.

It is now fashionable to talk about fixed versus variable costs as a fresh solution: keep the enrollment-driven formulas but add a catalogue of fixed costs. For example, present a separate subbudget on total cost of utilities; present other subbudgets on the library, the computer center, the maintenance and operation of the physical plant. The danger in such an approach is obvious. The logrolling evident in the capital-improvements process could easily contaminate any new system for calculating costs that are "more or less fixed." The line-item approach is inherently hazardous, because it is sensitive to interinstitutional warfare and because it acts as a disincentive to improvement.

Perhaps in the next decade, under the stress of severe cutbacks, institutional administrators will respond to the pressing need to develop sensible and appropriate measures of quality as a necessary ingredient in funding mechanisms. The insistent demands for economy, for rational use of scarce resources, for accountability, and for equitable treatment of like programs in state systems of higher education will not go away. But neither will the standard correlating enrollment and costs.

The possible benefits of modifying simple student-based funding outweigh the risks if administrators count their student "customers" as one piece of a mosaic funding model but, as part of that mosaic, use other cost units as well. For example, the appropriate cost units for physical plant are square feet of buildings and acres of land. Given those units, development of differential costs by type of activity is necessary, as in distinguishing between costs incurred in preparing Ph.D.'s and teaching lower-division classes.

For a single building, subactivities would include cleaning, heating, air conditioning, lighting, maintenance, water and sewage, and other special purpose costs such as fume hoods in chemistry labs. The "mosaic" approach is clearly preferable to "line-item" budgeting, which encourages blind replication of past practices and takes away management prerogatives. All costs are variable; they change as a function of one or more factors. The problem is to identify those factors that should be substituted for, or combined with, the FTE student unit.

Some Examples

Along with taking a fresh look at cost and funding models, administrators must shed their dependence on cost history as the sole basis for predicting future funding needs. Because of rapid expansion, an awesome series of future costs (not dreamed of in historical-cost analyses) has developed. Some of these costs—which businessmen would classify as depreciation items—would be problems even if we sustained our enrollment growth; their impact is magnified by stable or eroding resources. Other costs (to start new program directions or to meet the needs of students whose characteristics have changed, for example) have been masked in historical analyses because they were met through the use of expansion money; money provided to fund growth was diverted to fund new program directions. The following are examples of such costs:

- *Equipment replacement.* Much of the most sophisticated and expensive equipment currently used by institutions was purchased in conjunction with capital-expansion programs. Now that capital-improvements programs are being reduced sharply, a major source of equipment funding has disappeared. Institutions must seek alternate means to fund needs for new and improved equipment and to replace equipment purchased during capital-expansion projects. Most institutions lack adequate estimates of what costs will be faced in the future; certainly, historical program-cost information cannot be expected to provide any insights about these future burdens.
- *Building maintenance and repair.* Although historical-cost information will reflect some added operating costs already encumbered through past capital expansion programs—utilities, housekeeping, program staff—many standard maintenance and repair costs have not yet been encountered for buildings constructed within the past 20 years. On campuses across the country, roofs are deteriorating; electrical, plumbing, and mechanical systems are wearing out in buildings that old-timers still regard as new. Institutional and state budget officials must develop good projections of the ongoing future costs that have been encumbered by the capital programs of the past.
- *Building rehabilitation and renovation.* These problems, while similar to those enumerated earlier, provide more dramatic examples of major expenditures required when entire buildings must be rehabilitated to retain their usefulness, or converted to perform new functions.
- *Meeting new program needs in the absence of new money.* The constantly shifting program interests of students have been addressed during the last 20 years by using incremental funds provided for enrollment growth. With stable and declining fund levels, institutions no longer have the luxury of using new money to start programs; the problem is particularly severe when developmental costs are not accompanied by break-even enrollments during

the early stages of program development. Beneath higher education's deceptively stable appearance, forces are at work that change constantly the nature of its activities. These changing activities will require funds that are not predicted by funding models tied to the past.

There is much work to be done before cost information will adequately serve higher education and those who supply its funds during lean years. The logical flaws in existing costing tools are not new, but because of growth, their inadequacies were hidden from view. The opportunity to make long-overdue adjustments to costing tools will make them useful to college and university administrators.

Cost Analysis in the Appropriation Process

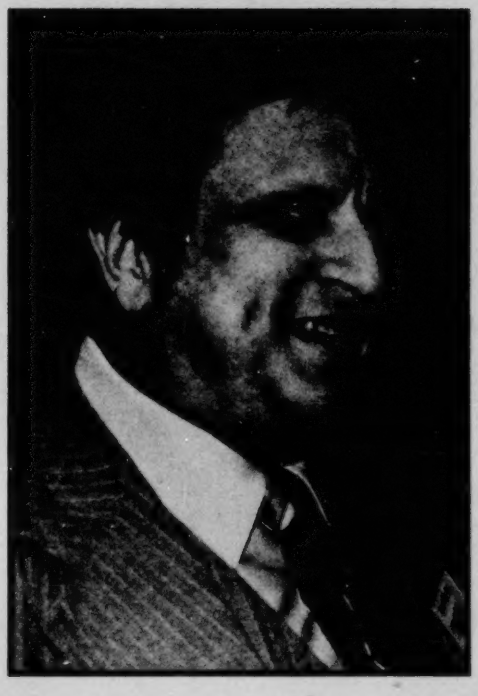
Cost analysis may often bear little relationship to the appropriation process; certainly this is true for the state of Ohio. The governor and the general assembly began budget review with an overriding "given": no new taxes. It is not that legislators are not sympathetic; they are. However, the appropriation process is riddled with political (or, from another viewpoint, public-policy) considerations. In Ohio, a trade-off was reached—some increase in the governor's budget item for higher education, coupled with a modified freeze on the undergraduate instructional fee. Cost analysis played little role in consideration of the issues, except in providing a historical record of past expenditures. The legislature has said, in effect, "Absorb a good part of inflationary costs."

In Ohio and in other states, the higher-education community is often reminded that it has no powerful constituency. Yet the recovery of public confidence is *not* to be won by more sophisticated cost analysis, a concern only to a very few, largely the technocrats.

Oscar Wilde's warning about those who "know the price of everything and the value of nothing" applies to institutional administrators, who must consider what the public wants of colleges and universities and what institutions are prepared to offer. The nation confronts inexhaustible supplies of new problems—energy, the arms race, inflation, diminishing rates of productivity. A recent Carnegie Council report captured headlines with loose charges about an alleged ethical collapse on campus, involving cheating, stealing, and lowering standards.

The past may offer guidance. When have colleges and universities received the public support they wished? For the most part, the good times have been those when institutions captured and rode the deep tides of public opinion. One recalls the initiatives which led to the land-grant movement and to the community college movement. One thinks of the way federal dollars poured in after Sputnik and after the national decision to invest heavily in medical research.

Administrators must turn to a careful reading of those "deeper tides." An American public persuaded that institutions know how to educate—yes, *educate*—their sons and daughters will provide the necessary support. Cost analysis, no matter how sophisticated, will not.



Frank B. Pesci, Sr. is a Maryland state legislator. Formerly, he was Associate Professor of Higher Education at the Catholic University of America and a Dean of Academic Affairs and Vice-Chairperson of the Board of Trustees at Prince George's Community College. He has served on the NCHEMS Board of Directors since 1977.

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An Overview of the Issues in Statewide Planning and Appropriation Processes and the Relationship of Cost Information to These Issues, from the Perspective of a State Legislator

Frank B. Pesci, Sr.

States take a number of different approaches when determining the extent of funds needed to support higher education. One common approach is to examine past trends to determine whether historical financial relationships are being maintained, or whether needed changes are taking place. A second approach is to compare a state's financial support to that provided by other states. A third is to determine standards that assure appropriate financial support for higher education: this approach often uses guidelines or formulas. Frequently some combination of all three approaches is used.

In theory, the resources provided from different sources should be related to the benefits each source receives from higher education. However, attempts to quantify the benefits accruing to the states, and to others contributing to higher education, have not been particularly successful. Consequently there continues to be considerable debate over the proper proportions of funds to be supplied by various sources, particularly by states and by students.

There are many theories as to what constitutes an effective state budgeting process for higher education. In order to determine the distribution of funds among institutions, most states use some combination of guidelines or formulas, together with needs analyses, that relates budgets to workload, performance standards, or unit costs. There are also major variances among states in the methods of appropriating the funds. Some states appropriate a lump sum for all institutions

to a central state coordinating agency or board of regents. Other states appropriate to institutions specific amounts for each object of expenditure within each program. Finally, some states appropriate only state tax funds, while other states appropriate all funds made available to an institution, regardless of source.

Department of Budget and Fiscal Planning (DBFP). In Maryland, each public institution and agency is required to submit a budget that lists programs and objects of expenditures within each program. Budgets contain this detailed information: (1) the actual expenditures from the previous fiscal year, (2) the current-year appropriation, and (3) the budget-year request. The DBFP reviews each budget, examining proposed items of expenditures and making highly detailed decisions. The budget process represents an incremental approach to budgeting in that primary attention is given to proposed increases over amounts appropriated for the previous year.

Supervision of institutional and agency expenditures is provided by the DBFP throughout the year, since the DBFP is charged with approving most contracts and expenditure requests at all institutions and agencies except the University of Maryland, which has statutorial autonomy. In addition, the DBFP is charged with approving all requests to transfer funds among programs and objects of expenditures. Review of the previous year's expenditures is made by the DBFP during its analysis of institution and agency request budgets.

State Board for Higher Education (SBHE). For FY 1979, the SBHE conducted its first review of budgets for the 11 public four-year institutions of higher education using this budget methodology. This review was based in large part on budget-analysis guidelines developed in 1976 by the Board in consultation with representatives from all segments of higher education in Maryland. The guidelines do these things:

1. Focus on productivity by estimating expenditures on the basis of the number of students expected to be served in a given year and the nature of the services to be provided
2. Focus on total program expenditures (such as instruction and student services) rather than on expenditures by objects within programs (such as salaries and travel)
3. Permit comparisons to be made among similar programs at different institutions in order to provide for equitable treatment of all schools
4. Take into account differences in the types and levels of instructional programs offered by different institutions
5. Take institutional size into account in order to recognize economies that are possible for institutions of different sizes
6. Approximate the expenditure norms for all institutions of a given size for similar activities
7. Utilize as much as possible the budget data submitted by institutions to the DBFP, in order to avoid additional data requests from institutions

The application of the guidelines produces an operating budget to maintain the existing educational programs at an institution. The guidelines do not account for an institution's special needs when it is initiating a new program, nor do they account for an institution's need to correct any past budgetary deficiencies. For example, if an institution needs to purchase a substantial number of new books, the guideline for the library program would not provide for such a catch-up purchase. The library guideline will only reflect normal operating and book-replacement costs. In addition, because the guidelines were derived to represent the average level of expenditures in a program for all institutions of a given size and type, and they represent a set of norms for institutional expenditures by program.

The SBHE budget process focuses on deviations of budget requests from the amounts calculated using the guidelines. Requests above or below the guidelines provide the basis for analysis of institutional priorities and special needs. It is hoped that this approach will permit the budget process to focus on broad policy issues and to judge institutional requests on their merit, in comparison to the merit of the requests of other institutions. When the SBHE evaluation process is fully implemented, judgments of institutional performance should provide an additional basis for evaluating budget requests.

Historically Maryland has not provided support for the direct instructional costs of summer school and the so-called minimesters at four-year institutions. The state has required that the direct instruction costs of these programs be covered completely by student tuition and fees. There has been a recent trend to make summer schools and minimesters completely self-supporting by requiring that the tuition and fees generated be sufficient to cover not only direct instructional costs but also the overhead costs. The University College of the University of Maryland also has long been almost completely self-supporting. These are the only instructional programs in the public sector that do not receive direct General Fund support. Because a growing proportion of all students in higher education are expected to be attending college part-time and at other than traditional times, current policies may have substantial impact on access for these students. For example, in the fall of 1977, 93 percent of UMUC's 12,400 students were attending on a part-time basis.

The major auxiliary enterprises at Maryland institutions are dormitories and dining halls. Historically dormitories and dining halls have been self-supporting in all areas except plant operation, which the state has subsidized. This present fiscal year is the seventh in a 10-year phase-out of state support of the physical-plant costs for these auxiliary enterprises. There have been attempts to reduce the rate of the phase-out from 10 percent a year to 5 percent a year to lessen increases in student fees, but the original schedule still is being followed. The principle of users paying for the costs of services when they are the sole beneficiaries provides an equitable basis for supporting these activities.

The current budgetary-guideline process of analysis for public four-year institutions used by the SBHE appears to alleviate some problems in traditional budget-analysis processes. The guideline method of budget analysis facilitates relating the total budgetary requirements of an institution to its specific program needs. Analysis concentrates both on total program costs rather than on incremental cost changes. In this sense, guideline analysis of budgets comes close to a zero-based approach. In addition, the use of guidelines establishes benchmarks for measuring the adequacy of state support and for assessing the equity of the distribution of funds among institutions. Agreement on a compatible process of budget analysis among all state agencies concerned with higher-education budgeting would help to reduce the costs of budgeting and would improve the quality of analyses.

The budget for each public four-year institution and for each state agency at present specifies the amount of funds by object of expenditure within each program. This system introduces rigidities into the administration of campus and agency budgets, because approval from the DBFP is required during the year in order to shift funds among programs and objects. This system also has the effect of diffusing the responsibility for allocation decisions and makes it difficult to hold administrators fully accountable for the performance of their institutions and segments. The trend among states has been to decrease the level of detail in state-level budget recommendations and appropriations. A balance is needed between allowing institutions the flexibility necessary to adjust resources to meet their needs and the level of detail required to provide the DBFP, the SBHE, and the legislature with information necessary to make budget decisions.

3

Florida

Background

This case study is based only on the experience of Florida's community-college system. The system consists of 28 separate institutions, some of which have more than one campus. There are community colleges in all parts of the state. The first was founded in 1933, and three others were founded or acquired in 1947-48. But the state system really dates from 1957, when the Florida State Board of Education adopted the Community College Council's long-range plan to provide post-high-school educational opportunities within commuting distance of virtually every resident in the state. With the opening of the 28th community college in 1972, this plan was essentially completed. Florida educators feel that its development and implementation was a model of long-range planning for the orderly development of a statewide system of community colleges.

Florida community colleges are comprehensive institutions, offering (1) freshman- and sophomore-level education of the kind commonly offered in the state universities, (2) occupational education, and (3) adult and continuing education. The first program is particularly important in Florida, because four of the nine state universities, including the only two in the Miami area, offer *only* upper-division and graduate instruction.

The Florida community-college system is noted for its blend of local control with state coordination and support. The 1957 plan provided that community

colleges were to be locally controlled, while operating within a broad framework of State Board of Education regulations that provide minimum standards and systemwide coordination. Originally, the colleges were developed as components of local school systems, controlled by local boards of public instruction. In 1968, governing authority was transferred to local junior-college boards of trustees, appointed by the governor and "vested with the responsibility to operate their respective junior colleges and with such necessary authority as may be needed for the proper operation thereof in accordance with the regulations of the State Board." The boards had no taxing authority, however, and for the next two years, local support continued to be provided through the taxing authority of the local school districts. In 1970, the school districts were relieved of responsibility for levying taxes for community colleges, and community colleges have been funded since then by a combination of state funds and student fees.

At the state level, Florida has a constitutionally-established State Board of Education comprising seven elected officials: the governor, who serves as chairperson; the secretary of state; the attorney general; the treasurer and insurance commissioner; the comptroller; the commissioner of agriculture; and the commissioner of education, who also serves as the executive officer of the Department of Education and secretary to the State Board. The State Board of Education governs the Department of Education and is the "chief policy-making and coordination body of public education in Florida." It has "general powers to determine, adopt, or prescribe such policies, rules, regulations, or standards as are required by law or as it may find necessary for the improvement of the state system of public education." The same group of elected officials also serves as the board of administration for a number of other state agencies.

The 1957 plan provided for the establishment of the Division of Community Colleges in the Department of Education. Recently, the legislature created a State Community College Coordinating Board. Operating under the general supervision of the State Board of Education, the board will be responsible for recommending statewide policy regarding operation of public community colleges and determining ways and means to coordinate the operations of community colleges with those of other institutions.

In the Department of Education, the director of the Division of Community Colleges is responsible for ensuring the greatest possible coordination, efficiency, and effectiveness of state community-college programs and for cooperating with other divisions in carrying out the mission of the department. Among the functions of the Division of Community Colleges are:

- Development and implementation of plans and standards of quality for the administration, operation, and accreditation of community colleges, in accordance with statutes and with the rules of the State Board of Education
- Review and approval of institutional annual operating and capital-improvement budgets on behalf of the commissioner of education

- Administration of an annual cost analysis
- Development of an annual operating-budget request for all colleges

Florida has the usual appropriations process with an additional step—presentation of the Department of Education's budget request to the State Board of Education. The board generally does not make substantive changes. Beyond this, the governor recommends and the legislature appropriates, on a biennial basis. Budgets are reviewed separately by committees in each house and reconciled in a conference committee.

Before the state took over, community colleges were funded by the elementary/secondary formula. During 1969-70, the state began to plan for funding community colleges from state sources on the basis of a formula of their own. Planning for the first Florida cost study also began then, and the first study was performed on data for the academic year 1970-71. The current community-college formula was implemented for 1973-74. During the interim, 1971-72 and 1972-73, community colleges were funded on the basis of the old elementary/secondary formula, with the local match taken out of the calculation. Both the basic framework of the cost study and the formula have remained essentially unchanged, although a number of incremental improvements have been made.

The Cost Study

Florida's cost study was first performed for 1970-71. It has been performed annually since then and is incorporated into the Community College Management Information System. The original cost study was based on an adaptation of a pilot-test version of the NCHEMS Information Exchange Procedures (IEP). That approach has been maintained, although incremental changes have been made to improve the reliability and usefulness of the data.

The cost study includes all current funds expenditures, unrestricted and restricted, with the exception of auxiliary enterprises (usually small in Florida's community colleges), fee waivers, off-campus work-study expenditures, and certain nonprogram expenditures for which the college acts solely as an agent for the flow of funds. (Those nonprogram expenditures include activities that could also be categorized as research or public service—for example, conducting a study for an agency of state government). In addition to current funds, certain capital expenditures (including depreciation), such as furniture and equipment and library books and films, are included in the cost study. Costs are not separately identified by source of funds.

Florida uses the Community College Information Classification Structure (CCICS) to describe the various activities of the colleges. Similar to many structures used in postsecondary education, the CCICS includes major functional categories for Instruction, Organized Research, Public Service, Academic Support, Student

Support, Institutional Support, Physical Plant Operation and Maintenance, and Student Financial Assistance functions, with subfunctions in some of the areas (see figure 1). In the Instruction function (Advanced and Professional and Occupational subprograms) each course is identified in a five-level hierarchy of subject matter established by the state. The first two levels are function and subfunction. The fourth and fifth levels are more or less equivalent to two- and four-digit HEGIS classifications. The third level supplies an intermediate level of detail. Expenditure information is collected in a matrix that has the activity structure on one axis and object-of-expenditure data on the other.

The Florida Department of Education collects both direct- and full-cost data for each discipline. No attempt is made to convert these discipline costs to student-program costs. Thus student information is not collected—only expenditure, faculty workload, and student-credit-hour data are collected, as backup data for the cost study.

Florida's *Community College Management Information System Procedures Manual* provides a number of worksheets to aid the colleges when they distribute expenditures to the various program categories. While the *Manual* states that the forms are meant only to guide the colleges, the instructions are specific enough to allow the colleges to actually use the forms, or a reasonable facsimile, thereby increasing the accuracy and conistency of their cost data.

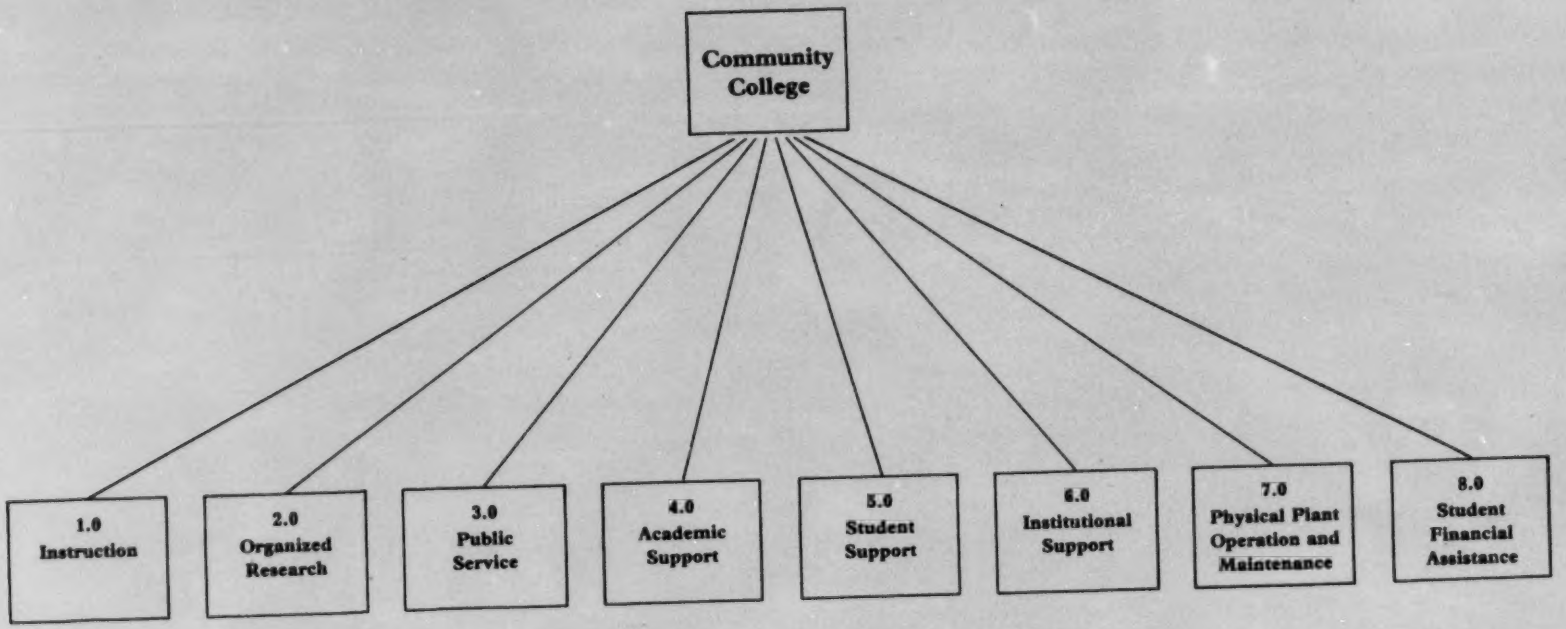
The community-college sector is relatively comfortable with the technical aspects of the Florida cost study. The Department of Education, with the cooperation of the colleges, periodically revises the cost study to improve some aspect, but the basic procedures have not been changed and appear likely to remain as they are. Both executive and legislative budget staffs work comfortably with the data, which are widely shared, and have confidence in the reliability of the cost study.

Use of Cost Information in the Budget Process

For several years, Florida has used a funding formula for community colleges that is directly driven by the cost study. The procedure begins with identification of the average cost of goods and services used in the previous year to deliver a unit (student credit hour) of education in courses in each of 34 fields of study. Utilizing an economic forecast of the consumer price index and the wholesale price index for the budget year, the cost of the same mix of goods and services is estimated for the year to be funded. Total dollar need is projected by applying estimated unit costs to the units required to serve projected student enrollments. The total of funds derived from student fees, federal programs, and other sources is then deducted to arrive at the recommended state appropriation. The formula is thus activity based; it does not undertake to fund student programs.

The cost data used to determine funding are compiled from the uniform statewide accounting and expenditures-analysis procedures followed by each community

FIGURE 1


Community College
1.0 Instruction
2.0 Organized Research
3.0 Public Service
4.0 Academic Support
5.0 Student Support
6.0 Institutional Support
7.0 Physical Plant Operation and Maintenance
8.0 Student Financial Assistance
1.10 Advanced and Professional
1.20 Occupational
1.30 Developmental
1.40 Community Instructional Service
3.10 Community Services
4.10 Learning Resources
4.40 Instructional Computing Service
4.50 Ancillary Operations
4.60 Academic Admin.
4.70 Course and Curriculum Development
4.80 Academic Professional Personnel Development
5.10 Social and Cultural Development
5.20 Organized Athletics
5.30 Counseling and Advisement
5.40 Placement Services
5.50 Financial Aid Administration
5.60 Student Records and Admissions
5.70 Health Services
5.80 Services for Special Students
5.90 Student Service Administration
6.10 Executive Management
6.20 Fiscal Operations
6.30 General Admin. and Logistical Services
6.60 Administrative and Support Staff Service
6.70 Community Relations

college. The college's projections include full-time-equivalent (FTE) student enrollments (which are evaluated by the Division of Community Colleges for reasonableness and approved by the Department of Education). Average unit costs are computed separately for colleges with more than 1,400 FTE enrollment and for those under 1,400 FTE to give some consideration to the economies of scale.

In addition to this formula-based calculation of funds for each of the colleges, certain nonformula items, such as Categorical Project or Special Funding, may be funded. Adjustments also can be made in formula amounts. State Board of Education Rules allow adjustments for size differentials, salary schedules, regional cost variables and other factors, when necessary to maintain quality programs and financial stability. In addition to the size-differential factor incorporated into the formula, this authority has been used in one major way. In years past, the legislature permitted the Division of Community Colleges to retain a small portion of the total appropriation, to be used as a contingency fund. The fund was used to assist colleges that demonstrated a critical need for more funds than were generated solely on the basis of FTE enrollment by field of study. In these instances, the college submitted a request to the director of the division. If the request appeared reasonable, a survey team of division staff and selected personnel from other colleges was appointed to visit the college and recommend an amount of additional funding. The division director forwarded the recommended allocation to the commissioner of education for approval. This process was used to ease the transition to the new formula and to accommodate colleges with declining enrollments. The legislature has not made contingency funds available to the division for the past two years, however.

If the legislative appropriation for community colleges is less than requested or enrollment is limited in the appropriation bill to a level below the projection, the formula is used to recalculate allocations so that each college maintains its proportionate share of the total appropriation. Funds are allocated to the colleges on the basis of projected FTE enrollments. This allows the legislature to see the effect on individual colleges of proposed changes in appropriation levels.

If a college actually serves more, or fewer, than the projected FTE students, funds are adjusted up or down in the next year by an amount equal to the state share of the direct cost per FTE of instruction. If funds recovered by the state as a result of under-enrollments are less than the amount required to cover over-enrollments, the funds available are distributed pro rata among those colleges entitled to an increase. The state will not add to the year's total appropriation. Colleges are given a ±5 percent "corridor" in which funds are not adjusted, under a new provision of the appropriation bill.

Cost data also are used in examining major state-level policy decisions, such as these:

- Determination of student tuition and matriculation charges
- Recommendations for changes in assignment of responsibility between delivery systems—universities, community colleges, area vocational centers, and so on
- Determination of the cost of Individualized Manpower Training Service (IMTS) and other compensatory-education programs, to assess cost effectiveness and decide whether or not they should be continued
- Determination of the cost of supplemental vocational education
- Estimation of the fiscal impact of legislation with systemwide implications
- Estimation of the fiscal impact of relative increases in part-time students
- Determination of the costs of specific policies regarding such things as campus maintenance, energy use, equipment replacement, and fringe-benefit packages

When enrollments were expanding, the colleges were happy to receive appropriation increases based on average full cost per student. Growing colleges can easily adapt to such a funding process. But when enrollments level off or decline, the phenomenon of marginal costs begins to be more clearly recognized. Colleges cannot reduce expenditures proportionately with reduced FTE without profoundly affecting programs.

The primary weakness of the current FTE-based cost-driven formula in Florida is that it assumes that all costs vary in direct proportion to enrollment. Also, a larger number of college groupings would be useful, since there are too many differences among the colleges now designated as large: they span a range from 1,301 to 35,000 FTE students.

Beginning in 1975, the staff of the Division of Community Colleges worked with a management-consultant firm to review the current funding process and developed an entirely new appropriation-generation and allocation process. Some examples of factors considered are program differences (vocational, transfer, compensatory, adult and community instructional services of colleges); the differences in individual college abilities to generate other revenue (student fees, federal funds, locally generated funds); regional differences in cost of living; age of the college; how marginal costs and fixed and variable costs should be used in the funding formula; how the funding formula can deal with new programs; how the funding formula can transcend historical costs to use projected costs that reflect more optimal conditions; and what categorical funding is needed to supplement the basic formula.

There was immediate evidence that historical average cost per student was not a valid basis for projecting future costs. For a given level of operation and time period, some costs appeared to be fairly fixed, and some appeared to vary with changes in enrollment. Based on these observations and analyses, the division developed a proposal for a new formula, designed to distinguish between:

- Fixed Costs—costs that typically do not vary with changes of enrollments within the normal range of operations
- Variable Costs—costs that typically vary directly with changes of enrollments
- Semivariable Costs—costs that typically vary somewhat with changes of enrollments within the normal range of operations

These three types of costs are then applied to each element of operating cost, based on the most prevalent characteristic exhibited by each cost element's normal behavior. The division's assessment of fixed, variable, and semivariable costs is shown in table 1.

TABLE 1

Cost Categories	Instructional-Program Costs			
	A & P	Occup.	Devel.	CIS
Personnel Costs				
Instructional	V	V	V	V
Administrative	SV	SV	SV	SV
Support Staff	SV	SV	SV	SV
Nonpersonnel Costs				
Supplies, Services	V	V	V	V
Equipment, Depreciation	F	F	F	F

Cost Categories	Support-Program Costs			
	Academic Support	Student Support	Institutional Support	Plant Operations and Maintenance
Personnel Costs				
Exec., Admin., Managerial	F	F	F	F
Noninstructional Professional	F	F	F	F
Support Staff	SV	SV	SV	F
Nonpersonnel Costs				
Supplies, Services	SV	SV	SV	F
Equipment, Depreciation	F	F	F	F

CODES: F = Fixed Costs; V = Variable Costs; SV = Semivariable Costs

Costs were then analyzed for each of these program areas and objects of expenditure within 11 size classes of institutions. The size classes were used to establish the normal ranges of operations in which fixed costs were believed to remain constant despite variations in enrollment. The size classes were also structured to accommodate the existing size of the colleges. An analysis of historical operating expenses indicated that a college's fixed support costs tended to remain constant until the total student enrollment changed by 50 percent, at which point

a distinct change in the total funding for support costs occurred. With this in mind, an algorithm was employed wherein normal operating-range intervals were established at points where total FTE student enrollment increased by 50 percent. Using this algorithm, the following college groupings were established as demonstrated in table 2.

TABLE 2

ASSIGNMENT OF COLLEGE GROUPS BASED ON FULL-TIME EQUIVALENT STUDENT ENROLLMENT

Group	Enrollment	Group	Enrollment
I	500- 799	VII	6,200- 9,399
II	800-1,199	VIII	9,400-13,999
III	1,200-1,799	IX	14,000-20,999
IV	1,800-2,799	X	21,000-31,599
V	2,800-4,199	XI	31,600-47,299
VI	4,200-6,199		

Using the matrix of fixed, variable, and semivariable costs shown in table 1, historical costs were calculated for each group. Essentially, fixed costs and the fixed portion of semivariable costs were subtracted from total costs, and the behavior of the residual was analyzed as a function of enrollment changes over the year. Variable cost factors were determined in this fashion. Using the fixed and variable cost factors and the expected enrollments in each program area and group of institutions, funding values were calculated for each college and recommended to the legislature.

The recommendation for a funding formula taking into account fixed and variable costs was *not* adopted by the legislature, primarily because of the effects of the formula on colleges in the districts of several key legislators, the complexity of the new formula, disagreement about the behavior of semivariable costs, and a debate about the appropriateness of the size categories for colleges. In negotiations between the legislature and the Department of Education and between the two houses of the legislature, several of the innovative features of the new formula were kept (primarily in the policy for nonstate revenues). But the fixed, variable, and semivariable cost components were dropped.

Prospects

The Florida cost study will almost certainly continue to be performed for the indefinite future, with minimum change in principles and procedures. The cost study is indispensable, both for Florida's existing method of funding community colleges and for the kind of reform in funding formulas that most interests the major participants. The cost study's technical accuracy enjoys a high level of

confidence on the part of the Division of Community Colleges, the executive and legislative budget staffs, and the institutions. Continued refinement of costing procedures and ever greater technical accuracy of the cost data are assured and will involve cooperation on the part of all major participants.

The future use made of cost information in the budget process is less clear. Florida is committed at all levels (elementary/secondary, community college, and state university) to cost-driven formulas and can be expected to continue this basic approach to budgeting. The *kind* of formula that will be used is much more open to question. As already noted, Florida developed a proposal for a formula that would take into account fixed, variable, and semivariable cost. This basic approach, ultimately rejected by the legislature, still enjoys the support of the Division of Community Colleges, the executive branch, and the senate. The house and a number of the colleges are considerably less enthusiastic. The advocates of the fixed/variable approach essentially see it as a way of making the distribution of funds more equitable and of dealing with problems that may arise as the pool of 18-year-old potential students declines. Opponents basically object to the negative fiscal impacts on particular colleges (an inevitable response to any change in a formula) and to the complexity of the proposal.

The fiscal pressure caused by declining enrollments is not extreme in Florida. The state is growing and has substantial in-migration. The very mildness of the enrollment problem suggests an alternative method of dealing with its consequences—grandfathering. Indeed, the Florida legislature has already approved a procedure whereby only 50 percent of the funding value of vanished enrollments would be removed in any one year. The projected enrollment decline in Florida is so small that grandfathering could be adopted without excessive cost to the state or severe perceptions of inequity.

Other, simpler versions of fixed-and-variable-cost funding formulas have been considered. The Florida senate has developed a proposed formula that treats instructional costs as variable and support costs as fixed and semivariable. Another possibility under consideration is the establishment of more size categories for formula values. This would have the effect of averaging in a college's fixed costs relative only to a group of closely similar institutions, easing the pressure on colleges with only slightly more students than 1,300 FTE, the present cutoff point for small-college designations. The size categories in the proposed fixed/variable formula could be used without the rest of the formula and are relatively well accepted by interested parties. There is a problem at the upper end of the scale, since the size classes get so large that very different sized institutions can be treated similarly. Still, this would be better than only two size classes.

So while the future of Florida's cost study seems secure, the prospect for fixed-and-variable-cost budgeting is uncertain. Although a formula based on fixed and variable costs enjoys the support of many important participants in the budget process, less radical alternatives are likely to be adopted, at least in the short run.

4

Indiana

Background

Indiana's system of public postsecondary education consists of Indiana University, Purdue University, Ball State University, Indiana State University, Indiana Vocational/Technical College (13 campuses), and Vincennes University. In addition to the main campuses, a number of regional campuses provide services. The largest regional campus, Indiana University-Purdue University at Indianapolis, enrolls about 21,000 FTE students. Indiana University is the original state university; Purdue is the land-grant university; Ball State University and Indiana State University evolved from teachers colleges; and Indiana Vocational Technical College was founded in 1965. Vincennes University has a history that is not easily categorized. It was founded in 1801, two decades before Indiana University, but was defunct for a number of years. It has developed into a comprehensive junior college serving the entire state and offering vocational and academic programs at the associate-degree level.

Each state institution is governed by its own board of trustees. The Indiana Commission for Higher Education is a state-level coordinating agency charged with (1) developing and maintaining a long-range plan for postsecondary education; (2) making recommendations to the governor, the budget agency, and the general assembly regarding postsecondary-education appropriations; and (3) approving new campuses, schools and colleges, and degree programs. Legislative sessions are annual, but most budget work is done in odd-numbered years. The five-member

Budget Committee includes majority and minority representatives from each house and the budget director, who is appointed by the governor. The Budget Committee operates when the legislature is not in session and makes recommendations to the governor and the budget agency.

Before World War II, each of the institutional governing boards submitted separate, essentially uncoordinated requests for funds to the general assembly. Indiana University and Purdue, which between them received most of the postsecondary-education appropriations, grew at about the same rate. Purdue's Agricultural Experiment Station and Agricultural Extension Service tended to balance Indiana's Medical School, so the appropriations for the two institutions were of about the same magnitude. Operating appropriations in 1930 and 1940 are shown below:

	1930-31	1940-41
Indiana University	$1,795,000	$2,325,000
Purdue University	$1,750,000	$2,325,000

In the late 1940s, however, competition for funds became a problem. In the legislative sessions of 1947 and 1949, considerable ill will developed between Indiana University and Purdue University. But both presidents came to the conclusion that life was too short to spend it fighting with each other and therefore became determined to discover a method for developing joint funding requests to the general assembly. As a result, the following clause was written into the Appropriations Act of 1949, and again each biennium through 1967:

> PROVIDED, FURTHER, That the four state universities shall continue to cooperate in working out a formula to be presented periodically to the General Assembly and any other proper authorities for budgetary purposes. Such formula to be based on beneficial data such as the following: Cost per student for on campus and off campus; number of students, including the number of students in each department; number of state students; etc.

Vague though this clause may be, between 1951 and 1967, the four institutions themselves cooperatively determined the proportional distribution of both operating and capital appropriations among them. During that period, the general assembly divided the total appropriation in the same ratio as the requests. If, for example, the requests totaled $200 million for the biennium for the four universities, and Indiana University's request was $80 million, or 40 percent of the total, and if the legislature finally appropriated $190 million, Indiana University would receive $76 million, or 40 percent of the total. The problem for the universities then became one of agreeing upon shares, and detailed methods for determining each university's share developed.

The earliest idea, advanced in 1950, was that each institution should develop its requests based upon "needs." But needs tend to be subjectively perceived, and any institution can identify a virtual infinitude of needs. Thus the requests of

1951, 1953, and 1955 were based almost entirely upon negotiation, with little use of data beyond general enrollment estimates and some consideration of faculty-salary needs. The idea was then advanced that current costs per student by level, multiplied by expected numbers of students, might serve as a first approximation of the basic instructional needs of the institutions. This idea brought with it the whole question of determining costs for each institution.

In 1954, the University of California had asked Western Conference (Big Ten) institutions to join it in a broad, definitive study of costs and expenditures, to be financed in part by the Ford Foundation. Purdue and Indiana joined this study with enthusiasm, hoping that it might lead to development of a rationale for the four Indiana schools. In the event, Indiana University and Purdue were able to agree upon a cost-analysis procedure, later accepted also by Indiana State and Ball state, that formed the basis for developing legislative requests and determining proportional appropriation shares.

In essence, the universities utilized standard procedures to determine instructional costs by levels and to project their enrollments by level for the next biennium. Simple multiplication of past costs per student times expected enrollment results in the budget request for instruction.

This still left the requests for such things as Indiana University's Medical Center and Purdue's Agricultural and Engineering Experiment Stations to be negotiated, as well as requests for faculty-salary increases, program improvement, and so on. Each school presented its case to the others, and agreements were reached. At last, a total figure emerged for each institution, representing its proportional share of the four-school total.

The cost-per-student data were used primarily to justify additional appropriations requested because of enrollment increases. Because 1955-67 was a period of rapid enrollment increases, this growth accounted for an important part of the total increase requested. The figures used were average unit costs by student level (freshman, sophomore, junior, senior, graduate) for each institution. Statewide averages were *not* used; instead, each institution justified its appropriation request on the basis of its own historical costs. The actual cost information was developed in the normal fashion of average-costing technology—that is, by assigning direct costs to individual courses, allocating indirect costs, and aggregating the data into whatever cells were deemed relevant (in this case, student level).

The system of unified budget requests broke down after 1967 for several reasons. First, the postsecondary-education system in Indiana became much more complex; Indiana Vocational Technical College had begun operations, and Indiana University and Purdue University began to develop their regional campuses. The increased number of participants made negotiations much more difficult. Second, Ball State and Indiana State were developing as universities and regarded the old formula as inequitable in light of their expanding mission. And finally, a new governor began to strive for more centralization in the budget process.

Beginning in 1967, Indiana adopted a program-budget process. The results were typical for that era. Massive amounts of data were collected. The budget request listed every course (and its class-size policy), every faculty member (and the distribution of his or her effort), and detailed descriptions of proposed program improvement, among other things. The amount of data collected exceeded the ability or desire to analyze it, and the system eventually collapsed of its own weight. In the early 1970s, what was called the building-block approach was adopted. This essentially accepted the prior-year base and focused analysis and debate on requests for incremental changes to the base. That basic method of approaching the budget remains in place.

The Cost Study

In its current form, the biennial Indiana cost study began in 1974-75. The cost study has been conducted for three consecutive fiscal years so far, and many of the technical and comparability problems have been resolved.

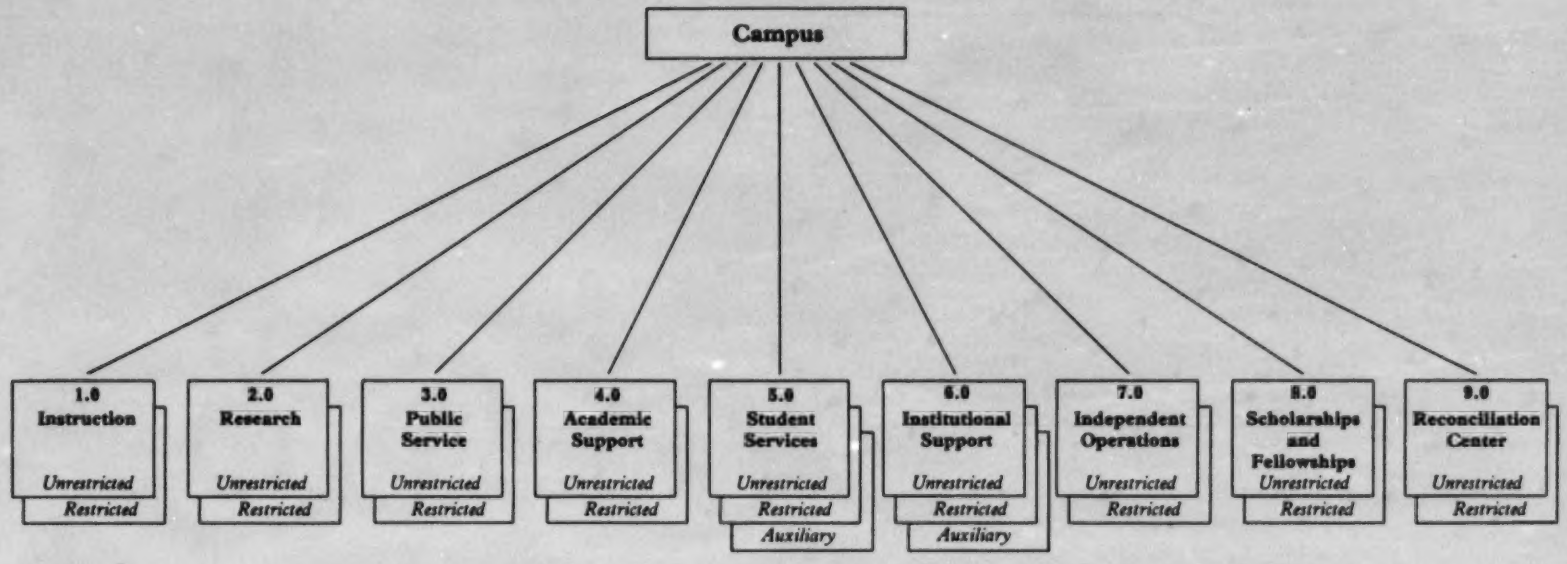
The Indiana cost study includes all current funds (General Funds, Restricted Funds, and Auxiliary Funds). It addresses the total expenditures of all current fund activities. Revenues related to particular expenditures (such as sales and services of auxiliary enterprises) are not netted out. Since expenditures are identified by revenue source (general, restricted, auxiliary), it is also possible to calculate net costs in each area as well as total costs. For example, certain categories of earned income can be netted out of general fund expenditures.

The cost study uses an activity structure (see figure 1) adapted from the NCHEMS *Program Classification Structure.* Major adaptations include: (1) the use of the traditional financial-reporting definition of individual research, which includes only those activities funded by a *specific* commitment of institutional resources; (2) the inclusion of cost/activity centers (and the appropriate protocols) to deal with joint campuses; (3) designation of a cost/activity center for capital expenditures (from the current fund) that cannot be attributed to a particular purpose; (4) specification of a series of protocols dealing with transactions other than expenditures; and (5) restructuring of the Instruction program to reflect state funding policies. Within the Instruction program, costs are collected by discipline/department (four-digit HEGIS), by course level (proficiency and certificate, lower division, upper division, dual division, master's, master's thesis, doctoral, doctoral thesis, general graduate), by student program (four-digit HEGIS), and by student level (certificate, associate, baccalaureate, first professional, graduate-master's, graduate-other, graduate-doctoral, unclassified).

In Indiana, the institutions submit data related to students, personnel, and expenditures to the Commission for Higher Education, whose staff actually performs the cost-study direct- and full-cost calculations. The commission then uses a variant of the NCHEMS Information Exchange Procedures (IEP) cost-study

FIGURE 1

INDIANA ACTIVITY STRUCTURE



1.1 On-Campus, General Academic Credit Instruction
1.2 Non-Traditional Instruction (Credit)
1.3 Community Education (Non-Credit)
1.4 Off-Campus, General Academic Credit Instruction
1.5 Contract Instruction: Restricted Funds

2.1 Institutes and Research Centers
2.2 Individual or Project Research
2.3 Indirect Cost Recovery

3.1 Patient Services
3.2 Community Services
3.3 Cooperative Extension Services
3.4 Public Broadcasting Services
3.5 Inter-Campus Services

4.1 Libraries
4.2 Museums and Galleries
4.3 Audio Visual Services
4.5 Ancillary Support
4.6 Academic Administration
4.7 Course and Curriculum Development
4.8 Academic Personnel Development

5.1 Student Service Administration
5.2 Social and Cultural Development
5.3 Counseling and Career Guidance
5.4 Financial Aid Administration
5.5 Student Auxiliary Services
5.6 Intercollegiate Athletics

6.1 Executive Management
6.2 Fiscal Operations
6.3 General Administrative Services
6.5 Physical Plant Operations
6.6 Faculty and Staff Auxiliary Services
6.7 Public Relations and Development
6.8 Student Recruitment, Admissions and Records
6.9 Inter-Campus Assistance

7.1 Independent Operations/ Institutional
7.2 Independent Operations/ Outside Agencies

8.1 Scholarships
8.2 Fellowships

9.1 Cost of Purchases for Resale
9.2 Capital Expenditures

methodology to calculate average unit costs (direct and full). The Indiana procedures differ from IEP mainly by providing more detail on funding sources and by not including the capital costs of depreciation (which are covered by noncurrent funds).

The final output of the cost study is then manipulated to deal with the three-year gap between the year for which the data were collected and the year for which the budget is being built. For example, the 1976-77 cost study (the most recent available) needs to be updated for use in the 1979-81 biennium. A base budget is built by applying the costs calculated for 1976-77 to the activity level (SCH) expected for 1978-79. This gives an imputed budget, which can be used to build the 1979-81 appropriation request.

Both institutional and state-level staff in Indiana are fairly comfortable with the costing methodology being used, given that average cost information is to be collected. Most of the comparability problems have been resolved, although it was felt that one more iteration of the cost study would be useful. A key action that helped solve the comparability problems was to require reconciliation of the cost-study data with institutional financial reports. Several problems remain, however. The differences between those institutions using an activity analysis to determine the allocation of faculty time and those using an assignment analysis are largely unexplored. In addition, a protocol is needed to ensure comparable reporting of student fees designated for purposes other than current operations.

Use of Cost Information in the Budget Process

As has been noted, Indiana has been using a base-plus budget system. The commission has defined the plus portion of the equation as adjustments for enrollment changes, program changes, quality-improvement changes, price-inflation changes, and (nonstate) revenue changes. The above list of factors can be said to constitute the state perspective on the budget. The institutions and the other state agencies may disagree with the specifics of commission proposals, but its organization of the agenda is generally accepted.

Within this agenda, the cost study has been applied extensively to the question of how to fund enrollment changes (in both directions). Attention to this question has become concentrated in recent years because of general dissatisfaction with applying average unit costs to enrollment increments and the perception that enrollments are going to decline.

During the 1976-77 budget cycle and the development of recommendations for the allocation of the Enrollment Contingency Funds ($2.4 million withheld by the legislature, pending actual enrollment reports for 1975-76), the Commission devoted considerable attention to the budget implications for changes in enrollment. Since enrollments were generally projected to be either increasing or remaining stable, the focus of attention was on additional funding needs resulting

from rising enrollments. Although possibly not the most accurate description, the label *marginal costs* was put on the incremental costs associated with the changes in enrollments. An added reason for scrutinizing enrollments at this point was that before 1975, there was no uniform approach to enrollment changes. Funding criteria for institutional requests varied widely. The legislature had given low priority to funding enrollment changes in the more recent biennia. Thus the need for some overriding policy or conceptual approach seemed imperative.

The commission's first assumption was that in the short run, the budget implications of changes in numbers of students were related to the *direct cost of instruction*—that is, numbers of faculty, academic support, staff, instructional supplies and equipment, and so on. Excluded were library, student-service, physical-plant, and institutional administrative costs. It was recognized that over a long period, there would be cost implications for these excluded types of support, but the intent was to address those issues separately. For example, in the commision's budget recommendations for 1976-77, some funds for library budget expansion on one campus were included as part of enrollment-change funding. The basic concept adopted for budgeting enrollment change, however, was that direct instructional costs only would be addressed in any overall enrollment-change funding recommendation. Thus all or some portion of direct instructional costs (which constitute 55 to 60 percent of the institution's total General Fund Budget) would be considered to vary with changes in enrollment, and the remaining 40 to 50 percent of the General Fund Budget would be considered to represent fixed costs in the short run.

The next questions were: What portion of the direct instructional budget should be considered variable? Should the degree of variability be the same for all magnitudes of enrollment change? Are the variable costs the same for declines in enrollment as for increases?

Institutional budget requests provided little guidance in resolving these questions. The requests reflected enrollment-change marginal costs varying from 1 to 125 percent of direct instructional budgets, and the percentage change in costs in the institutional budget requests seemed to have no relation to percentage changes in enrollment. Since no declines in enrollments were projected, no proposed reductions in budgets were proposed.

After study of the supporting budget documentation provided by the institutions and examination of some historical budget data provided by one institution, commission staff observed that there appeared to be some connection between the *percentage* change in enrollment and the *relationships* between marginal and average instructional costs. In other words, the evidence seemed to indicate that the marginal cost per student for a campus adding 500 students to an enrollment of 5,000 total students was a greater proportion of average cost than that of another campus adding 500 students to an enrollment of 24,000 total students. The first campus was experiencing a 10 percent increase in enrollment, the second only about a 2 percent increase. The evidence seemed to support what one could

logically expect to happen—that it is both easier and less costly to accommodate small increases in enrollment than larger changes.

After further study, the commission recommended and the legislature adopted the following factors for funding enrollment changes, both for the budget year and for the distribution of the Enrollment Contingency Fund:

TABLE 1

Percentage Change in Enrollment	Marginal Cost as Percentage of Historical Average Instructional Cost
0.1— 2.5	24
2.6— 5.0	41
5.1— 7.5	51
7.6—10.0	57
10.1—15.0	67
15.1—20.0	76
20.1—25.0	88

For example, a campus projecting an enrollment increase (or decrease) in an academic unit of between 0.1 and 2.5 percent would have its incremental funding adjusted by 24 percent of its historical average direct instructional cost for that particular academic unit.

All concerned recognized that there was no conclusive evidence to support these specific factors and that further study of the issue of marginal costs was needed. The methodology used to derive the factors was not sufficiently rigorous. Indeed, historical data may be of little value, because historical costs change as the amount of available income changes and may not reflect normative costs.

The institutions raised three main objections to the marginal-cost factors: (1) the factors were too low and did not reflect actual cost behavior, (2) the different marginal-cost values for different enrollment-change magnitudes were questionable, and (3) the long-range effects could be to depress average direct instructional costs. (Note that rising or stable enrollments were still assumed at this point.)

In an attempt to further understand the costs related to enrollment change, institutional representatives and state-agency staff joined in an exercise to identify the *variable* and *fixed* costs related to enrollment change. They assumed that these definitions would be applicable over a relatively short period, one to five years. This meant that relatively more costs would be considered fixed than would be the case for a longer period. (This is so because long-run decisions can be made about resources such as capital facilities that are fixed in the short run.)

As a result, types of costs were designated as fixed, variable, or semivariable. Semivariable costs were defined as those in which some part of the total was fixed, while the remainder was variable. At the end of the exercise, consensus had more or less been achieved that the percentages of costs shown in table 2 could be considered variable with enrollments. (It is important to note that it was in a normative, not an empirical, sense that the variability of costs was assessed.)

TABLE 2

Teaching Salaries	100%
Other Faculty Salaries	10%
Academic Support Staff Salaries	40%
Instructional Supplies and Expense	40%
Academic Support	25%
Sponsored Research	0
Public Service	0
Student Services	0
Institutional Support	5%
Physical Plant	0

Applying the above assumptions to the direct costs each component provides a variable-cost value of about 70 percent of the average direct instructional cost. Obviously, changing some of the assumptions, particularly those related to the portion of total faculty-salary costs associated with teaching, will alter the calculated variable-cost value.

This exercise did lend credibility to the notion that marginal cost (at least in the short run) is less than average cost. However, since the calculation was not supported by strong empirical evidence, it was still impossible to fully meet institutional objections about the realism of the commission's marginal-cost analysis. In addition, this approach did not address the question of different average-cost/marginal-cost relationships for different magnitudes of enrollment changes.

The third concern about the state policy—the long-range implications of its application for average instructional costs—was also studied. Those implications were significant. As one adds students at a lower funding per student, the overall average instructional costs will fall. The converse is also true—during a time of declining enrollments, average instructional costs will rise. The commission documented the results of such a policy in a financial sense, if not in an educational one.

After this exercise, the commission concluded that there was little existing empirical evidence to support any specific set of marginal-cost values. Accordingly, the commission recommended and the legislature adopted a set of values designed to produce a cost curve with smaller changes for a given enrollment change. Essentially, the desired effect of enrollment changes on *average* costs was determined and then used to work backwards to the set of marginal-cost values.

It should be noted that the above factors for marginal costs related to the general-fund budget adjustments for enrollment, not just to state appropriations. It is also important to note that these figures apply to enrollment changes from year to year and do not reflect cumulative changes over a longer period. Student tuition and fees are a separate consideration in the budget buildup. It may be of interest to observe that if a new student's tuition and fees add about $600 to operating *revenues,* less than this will be added to costs in instructional programs

when only marginal costs are considered. An enrollment increase can thus lead to a decline in state appropriations. Conversely, when enrollments decline, the revenue loss associated with small changes in enrollment will exceed the marginal-cost savings and therefore lead to an *increase* in state appropriations.

The 1977 general assembly again used the commission's recommendations that the funding of enrollment increases be based on the revised marginal-cost values for the funding of the institutions' operating budgets for the 1977-79 biennium. Furthermore, when adjustments to the 1976-77 funding level were incorporated in the appropriation for 1977-78 because actual fall 1976 enrollments differed from projections, these adjustments were also based on the revised marginal-cost values.

Future Prospects

The future of the Indiana cost study appears to be relatively secure. The state agencies and the institutions are comfortable with it, and the data-collection mechanism is stable, making cost information now easier for the institutions to generate. Efforts to improve the comparability of information probably will continue. Indiana will continue to collect the same kind of average-cost information. However, many of the intermediate products of the cost study (student records, faculty records) are useful for kinds of analyses other than the computation of historical average unit costs.

Stability is less certain regarding the application of cost information in the budget process. The commission believes that the existing marginal-cost concept used in budget analysis will continue to be appropriate. To adjust for enrollment declines on the basis of average cost of instructional activities is recognized as unrealistic and as creating potential for serious financial difficulties for institutions. Since the legislature has already provided appropriations on this basis, political support for such an approach would seem to exist.

There remain a number of problems with the current approach that may require substantial change. First, everyone involved recognizes that there is little, if any, empirical support for the specific funding factors used in the marginal-cost approach, especially when enrollment decline is being considered. These factors are artifacts of a particular average-cost curve, which itself has no empirical support. If further research cannot verify the factors now used, they may begin to be perceived as not accurately reflecting institutional cost behavior and therefore not solving the institution's fixed-cost problems—or alternatively as allowing fat in institutional operations. These kinds of perceptions can cause the political consensus behind the approach to break down rapidly. In this kind of environment, even the general agreement about the existence of a marginal-cost effect will not suffice to maintain the system intact.

On the other hand, a movement toward realism also involves risks. First, a totally realistic portrayal of costs is extremely expensive to accomplish. Second, excessive realism may make any application very complex and threatens the understanding, and hence the existence, of the funding factors. Third, a cost study that reflects actual institutional cost behavior may lead to an assumption by state-level decisionmakers that the internal expenditure of institutions can and should be controlled at the state level, on the basis of a realistic allocation mechanism.

A second potential problem is the long-term effect of the marginal-cost concept. The concept has been questioned because of the converging trend between marginal and average cost in the very long run. (As the planning horizon recedes, the costs of the institution include fewer fixed costs—faculty retire, facilities are demolished, technology changes.) The application of this formula will cause changes in expenditure levels that may be neither intended or justifiable. In addition, the funding factors take no account of the cumulative effect of an enrollment decline on institutions. A 15 percent enrollment decline in one year is treated in one way; a 5 percent decline for three consecutive years in another. A third long-run problem is the failure of the funding factors to deal significantly with noninstruction factors. These can be ignored in the short run, but probably not forever.

A third perplexing aspect of any budget adjustment for change in enrollment based on marginal adjustments different from average costs is the apparent conflict that this concept has with equitable funding. One of the long-range goals that the Commission for Higher Education regards as desirable in higher education is achievement of equity in funding—similar dollars for students at the same level in similar programs. Through cost analyses and other studies, it may be possible to develop standard prices for similar services. But how does the state maintain the standard pricing (and funding) approach under the application of the marginal-cost concept—and should it? As campuses move in different directions with respect to enrollment levels, marginal adjustments to standard costs will create new and *different* prices. Uniform pricing at some starting point would disappear over time.

Indiana's innovative use of marginal-costing concepts in the budget process has laid some important groundwork, both analytically and politically. It remains to be seen, however, whether further research or consensus building, or both, can maintain the approach in the face of the pressures we have described.

5

Washington

Background

Washington's system of public postsecondary education includes two major doctoral universities—The University of Washington and Washington State University; three regional universities—Central Washington University, Eastern Washington University, and Western Washington University; a four-year college—The Evergreen State College; and a system of 22 community-college districts including 27 colleges. The two doctoral universities offer a full range of academic and professional programs. The University of Washington, the sea-grant institution, has responsibility for the health professions. Washington State University, the land-grant institution, has responsibility for agriculture and veterinary medicine. The three regional universities developed from teachers colleges and offer degrees through the master's level. The Evergreen State College has a dual role, offering innovative forms of higher education and serving the educational needs of southwest Washington. Approximately 55 percent of the state's FTE student enrollments are in the community-college system. Programming in the community colleges is about 50 percent occupational and 50 percent academic and general education. With the exception of limited local income, those colleges are funded entirely by state appropriations. Student fees are deposited in the state treasury as general revenue and are not directly associated with the support of higher education. No local property tax is used for their support. Each of the six four-year institutions has its own governing board. Each of 22 community-college districts has a local

board, which shares governance responsibility with the State Board for Community College Education. The Washington Council for Postsecondary Education, the state coordinating agency, is charged with: (1) comprehensive postsecondary-education planning; (2) reviewing existing and proposed degree programs; (3) analyzing and recommending action on tuition and fees, transfer policy, and program need determination; and (4) reviewing institutional operating and capital budgets in the context of the statewide plan. The council is also the state student financial-aid agency. The State Board for Community College Education provides overall coordination and direction for the community colleges. It prepares a consolidated budget request and distributes operating and capital appropriations to the 22 districts. Under Washington's appropriations process, the legislature acts on the governor's budget recommendations. The budget is biennial, subject to annual revision in a special session at the call of the governor.

Washington's interest in postsecondary-education cost data began in 1970. In that year, the Boeing Corporation, the single largest employer in the state, laid off a significant portion of its work force. In combination with other factors, this plunged the state into a deep recession. This environment represented a marked change from the expansionism of previous years, when the state had established a new four-year institution (the first this century) and had assumed full financial responsibility for the community-college system. Revenue expectations were drastically reduced, and difficult decisions about state priorities had to be faced.

Therefore the governor asked the newly formed council a series of questions about relative priorities in postsecondary education. The council, feeling the need for cost information to respond to these questions, completed a cost analysis in scarcely three weeks. As can be imagined, the methodology was crude, the data were approximations, and the process was unworkable without the cooperation of the four-year institutions and the new community-college system. The analysis did, however, provide useful information for council deliberations, which the governor used in turn in his response to the fiscal crisis. Perhaps as important as the immediate use was the introduction of this type of information to the governor and legislature.

In the following year (1970-71), several legislative resolutions were passed, requesting cost comparisons among various programs and levels of instruction. Accordingly, the council conducted another cost study on much the same basis as the first. However, the results were viewed with somewhat more confidence, given the previous experience and somewhat longer time span for the study. The cost figures were received with interest by the institutions, the council, the State Board for Community College Education, and executive and legislative staff. The most important single use of the 1970-71 data was the development of a new allocation formula for the community-college system. The cost data were used heavily by a task group charged with developing a formula to be driven by student-faculty ratios and instructional support costs for 14 clusters of HEGIS disciplines. Since the earlier formula distinguished only between academic and

vocational courses and lacked empirical support, the new formula was viewed as a major refinement.

However, the 1970-71 cost study still had a number of technical deficiencies. Therefore a major effort was made during the 1973-75 biennium to develop a comprehensive and technically sound cost study responsive to state-level information needs. The council reviewed potential uses of cost and other financial information and considered appropriate levels of detail and the allocation of indirect costs in an effort to develop a single data base of cost and other financial information that could serve multiple purposes and users. After determining the broad outlines of a costing system, the council, with the aid of consultants and an advisory committee of institutional representatives, developed a specific design for a data-reporting manual and the computer systems necessary to manipulate the data. The result was the Washington Unit Expenditures Study (UES), conducted first for the 1972-73 fiscal year and every two years since.

The cost study was immediately caught up in Washington's attempt at program budgeting. Program budgeting for the four-year sector, which involved a massive effort to reformat the budget into program rather than organizational categories, shortly proved incomprehensible to everyone concerned and was abandoned. In the community-college sector, however, the process was carried considerably further, largely at the initiation of the State Board for Community College Education. Using data derived from the UES, the board developed costs for student programs and presented its budget request based on the production of student FTEs in a variety of programs and majors (as well as in the conventional format). However, this approach was not adopted by the legislature and was not continued during subsequent biennia.

The Cost Study

The biennial Washington Unit Expenditures Study has been conducted three times since it was defined during the 1973-75 biennium and conducted for the 1972-73 fiscal year.

The cost study includes all current funds (General Fund, Designated Funds, Restricted Funds, and Auxiliary Enterprise Funds). The basic data-collection form includes a fund-code identifier so that each funding source may be considered separately. The UES now uses an activity structure adopted from the NCHEMS *Higher Education Finance Manual* (see table 1). Important features of the activity structure include (1) the organization of the Instruction program to match Washington funding policies; (2) the identification of Libraries as a separate program; (3) the inclusion of Intercollegiate Athletics, other Auxiliary Enterprises, and Student Aid as part of the Student Services program; and (4) the establishment of a program to identify sponsored activities in the overhead areas (as a way of identifying indirect overhead expenditures in those areas). Within the Instruction

TABLE 1

ASSIGNED ACTIVITY CODES AND LEVEL OF DETAIL

Program-Activity (Card Column)	Program (5)	Subprogram (6)	Discipline (7-10)	Course Level (11)	Funds (12)
Instruction					
General Academic	1	1	XXXX	X	X
Health Sciences (4-year)	1	2	XXXX	X	X
Occupational (2-year)	1	2	XXXX	X	X
Special Sessions	1	3	XX00	X	X
Community Education	1	4	0000	0	X
Extension Education	1	5	0000	0	X
Research					
Agricultural Research Centers and Institutes	2	1	XX00	0	X
Other Institutes and Research Centers	2	2	XX00	0	X
Individual or Project Research	2	3	XX00	0	X
Public Service					
Community Service	3	1	XX00	0	X
Cooperative Extension Service	3	2	XX00	0	X
Primary Support Service					
Academic Computing	4	1	XX00	0	X
Ancillary Support	4	2	XX00	0	X
Academic Administration	4	3	XX00	X*	X
Libraries					
Libraries	5	1	XX00**	0	X

Student Services					
Basic Student Services	6	1	7100	0	X
Financial Aid Administration	6	1	7200	0	X
Educational Opportunities Program	6	2	0000	0	X
Other Special Programs and Services	6	3	0000	0	X
Intercollegiate Athletics	6	4	0000	0	X
Auxiliary Enterprises	6	5	0000	0	X
Student Aid	6	6	0000	0	X
Hospitals					
University Hospital	7	1	0000	0	X
Harborview Medical Center	7	2	0000	0	X
Patient Service	7	3	0000	0	X
Institutional Support					
Institutional Management and Services	8	1	0000	0	X
Fiscal Operations	8	2	0000	0	X
Comm. Relations and Development	8	3	0000	0	X
Unemployment Compensation/Supplement	8	4	0000	0	X
Plant Operation and Maintenance					
Plant Operation and Maintenance	9	1	0000	0	X
Sponsored Programs					
General	10	1	0000	0	0

*Level codes should indicate specially designated areas of responsibility, if any. For example, undergraduate deans should have level code 1; graduate deans should have level code 5; deans with no specific designations related to course level should have level code 0 (zero).

**5.1.0041 for general learning resource expenditures.

program, data are collected by a four-digit HEGIS code—two-digit for special sessions—and level. Two-digit HEGIS detail is collected for research, public service, primary support services (that is, Academic Support), and libraries.

The institutions submit financial and activity (student credit hour) information to the council for each of the cells of a matrix showing discipline, level, and fund source. Institutions allocate costs to the cells using institution-specific, yet similar, methods based on assignment of faculty to courses. That is, all faculty salaries specifically allocated for research or public services are assigned to those categories, and the remainder are assigned to course levels using the institution's methods. All other costs follow faculty salaries proportionately. Cost allocation is sequential, however, with the result of the first round affecting the second round, and so on. Washington follows the traditional financial-reporting definition—that all costs not assigned to research or public service by a specific commitment of institutional resources are considered instructional.

Washington's final cost study reports information on the cost to produce a student FTE in a particular discipline, not in a particular student program. Therefore the Washington Unit Expenditures Study is an activity-based costing system. Although the UES results are used in conjunction with other information for program-cost analysis, the council decided early in the development of the UES to restrict its uniform data base to an activity orientation. This restriction was based on the large volume of information strictly related to activity costs, not to mention the considerable increase in information needed for program costing; the varying program definitions among the institutions and the varying requirements for matriculation; and, perhaps most important, the recognition that program evaluation required not only cost data but also a variety of other elements, which could not be satisfactorily incorporated into the standard statewide costing system. A further reason was an *a priori* assumption that resource-allocation decisions at the state level would not be based upon student field of study, but rather that program analysis would take place on a selected basis only.

Considerable controversy surrounds the methodology of the cost study. The council, the board, and the legislative and executive branches express confidence that the cost study provides reliable information at a reasonable cost. The institutions, on the other hand, feel that the cost study is overly complex (and thus costly); is not translatable to the institutional budgeting and accounting structures (and thus discourages use by program managers); is based on extensive manipulation of already questionable data (especially the faculty activity analysis); is conducted too hastily; fails to reflect role and mission differences among the institutions (especially in the case of major research universities); generates cost data with technical (relating to standard definitions, data classification structures, and procedures) as well as substantive (relating to the characteristics results, and benefits of programs) compatibility problems; and falls short of its original goal to meet all the financial data needs of the council and the other potential users of financial data, especially at the institutional level.

Use of Cost Information in the Budget Process

The Unit Expenditures Study is used primarily by the two state postsecondary-education agencies (the Council for Postsecondary Education and the State Board for Community College Education). Although the executive and legislative branches have confidence in the technical integrity of the cost study, they do not use it extensively, for several reasons: (1) the timing of the cost study does not coincide with the timing of the appropriations process; (2) the funding formulas used by Washington are independent of the cost study; and (3) the legislature has been largely persuaded that formula factors should not be used to hold institutions accountable for a particular pattern of expenditures. The institutions do not make substantial internal use of the cost-study data, primarily because the categories of information in the cost study are not relevant to internal decisions. However, they do use cost-study data when responding to initiatives of the council or when seeking to persuade the council on an issue raised by the council.

The council uses information from the cost study for three major purposes. The first is setting tuition and fee levels. In 1975, the legislature requested the council to determine the appropriateness of relating tuition and fees to the cost of instruction. The council recommended that the legislature should, indeed, base undergraduate tuition and fees on undergraduate instructional costs. Other fee categories were derived as proportions of that basic rate. The council further recommended that university students should be charged an amount equivalent to 25 percent of the actual costs of instruction in the preceding biennium; regional university students, 20 percent; and community-college students, 16.7 percent. In 1977, after extensive debate, the legislature established tuition and fee rates based on a modification of the council's recommendation. Specifically, it related charges at the regional universities and the community colleges to percentages of the rates charged to research-university students. It also provided by law that the methodology for calculating the cost of instruction was to be established by the house and senate Higher Education Committees and that the council would implement that methodology and recommend rates to the governor and legislature.

The council then worked with the two education committees to develop an appropriate methodology for calculating undergraduate instructional costs. The fee-setting process then is based on figures derived from the Unit Expenditures Study. These factors and ratios are applied to the budgeted operating levels of the two research universities to ascertain the budgeted cost of undergraduate instruction at the two major institutions. This cost is the basis for the council's recommendation to the governor and the legislature for specific tuition and fee rates.

While the Unit Expenditures Study plays a large role in the actual calculation process, it is not viewed as a substitute for policy judgments. Still in question are whether tuition and fees should be based on instructional cost, what proportion is appropriate, and whether the cost should be calculated on a historical basis or

projected—all these are policy issues. UES has come to be used to shed light on these policy questions, not to answer them.

The second major use of the cost study is the periodic evaluation of the assumptions contained in Washington's budget formulas, especially the formulas for Instruction and Departmental Research. In Washington, formulas tend to remain constant for a number of years, while the legislature funds varying percentages of the calculated full levels. The formula used for four-year institutions is viewed as a method for justifying resources and allocating those resources to campuses, not as a method for controlling expenditures at a detailed level. Certain fixed formula percentages are identified in the appropriations act, however. This formula, developed in the late 1950s, was restudied and modified in 1967 prior to the development of the UES study and is based on faculty workload standards, with all other resources following the faculty proportionately. While objective faculty load and cost information figured heavily in its derivation, the formula was also significantly influenced by the policy judgments of the participants in the budget process.

Several years ago, the legislature directed the council to examine the instructional formula and recommend revisions. The council's recommendations, made just prior to the 1977 legislative session, were based on actual expenditure patterns shown by the UES. If implemented, the recommendations would have caused a substantial reallocation of faculty among institutions. In lieu of adopting the recommendations, the legislature directed the council to continue its study. During the current biennium, the council has derived from the Unit Expenditures Study a specific formula data base for examining the applicability of the formula factors assumed in the existing system. In the process, a significant difference in interpretation of the proper allocation of faculty salaries for cost-sharing agreements, which would have substantially influenced the recommendation, has been discovered. The council is currently revising and updating its proposals. The Unit Expenditures Study findings have played a major role in evaluating the applicability of the existing formula ratios and will serve as the primary basis for recommendations on new ratios. However, in recommending ratios, the council does not plan to rely *solely* upon this source of information but rather on special studies and interinstitutional and intersegmental discussion and consultation as well. Since the UES and the state budget formula for four-year institutions are similarly but not identically organized, the link between the two is not as obvious as it might be. The two are reconcilable (and are reconciled in the council's analyses) but are different enough to cause policymakers some confusion. In the community-college sector, the link between the cost study and the budget formula for instruction is more clear cut. The community-college system uses a formula that is differentiated by four-digit HEGIS disciplines, using data derived from the 1970-71 UES and the system's management information system.

Since both Washington formulas are driven by average costs (in this case, normative average costs), there is some uneasiness about the usefulness of the

formula factors and their ability to yield appropriate levels of funding for educational activities. State and institutional staff in Washington are aware of the limitations of average cost data in predicting actual cost behavior in a changing environment. Washington, however, has several mitigating factors. First, the state does not expect significant enrollment decline in the 1980s. Rapid economic development is leading to substantial in-migration that is counteracting the proportionate decline in the traditional college-age cohort. Enrollment decline is likely to be local and not severe. The one institution with enrollment difficulty is widely perceived as having an educational program problem, rather than as being the forerunner of a general enrollment decline. Second, Washington has already decoupled enrollment from some of its noninstructional formulas, such as the library formula, which is a model for many other states, and the physical-plant formula. For these reasons, the council is taking a "go slow" approach in adopting alternatives to average-cost formulas. It feels that more work in the institutions is necessary before marginal-cost concepts can be incorporated in a state-level funding formula.

The third use of the cost study is in the council's program review process. A wide variety of data is used here, including information from the UES. It should be noted that a decision was made in the design of the UES to forego program costing. The data from the UES can be used in conjunction with information collected during the program review process to produce the necessary comparative information.

Prospects

The future of the Washington UES is unclear. The council, the board, and staff at legislative and executive agencies are committed to it, feeling that it has technical integrity and serves a number of important statewide objectives. The community colleges cautiously endorse the use of cost study data in developing common two- and four-year resource-acquisition formulas, provided that economies of scale and basic role and mission differences are recognized in the process. They make extensive use of cost-study-generated formulas in their own internal allocations of resources among colleges. With respect to establishment of tuition and fee charges, they accept the use of cost-study data, but feel that community-college fees should be related to community-college costs, not those of the research universities. The four-year institutions, especially the University of Washington, question its technical integrity, its validity in the face of institutional role and mission differences, its compilation cost, its complexity, its failure to meet institutional information needs, and its real usefulness in state-level applications. In short, the four-year institutions appear to disfavor the UES costing model. While lack of institutional support is not necessarily fatal to a state-level costing system as long as the cost study meets perceived state-level needs, it does create difficulties.

There is no indication that Washington intends to discontinue basing tuition and fees on the cost of instruction. However, a simpler cost study could provide this benchmark with the expenditure of less effort than required by the UES. The future of the UES thus depends largely on its usefulness in assessing the formula-budget factors used in Washington. In this, its basic usefulness seems assured, although its methodology may be modified and simplified. (Indeed, a number of the data elements formerly collected already have been eliminated. Since many of the institutional objections derive from a sort of cost-benefit calculus (that is, from the cost study requiring substantial effort for questionable returns), simplification may prove attractive. In any case, state agencies (including the executive and legislative budget agencies) feel the need for a "reality check" on the formulas to ensure that they continue to reflect actual institutional and state needs. The cost study is not perceived as the only instrument for this evaluation, but it does play a role. It is likely to continue to do so, even though Washington's formulas will not be under the pressure of the formulas in states with declining enrollments. The institutions, on the other hand, recognize the need for formula revision but question the derivation of cost information on a regular basis to support an episodic review of the formula. In the event that the cost study is continued, either on a regular or episodic basis, a number of changes have been suggested by institutional representatives. These include (1) simplification of data needs by using actual budget and accounting data to the maximum extent possible, (2) development of procedures to allow the aggregation of data used at the institutional level, (3) avoidance of subjective determination of critical factors such as faculty activities, (4) design of the data-analysis system in a manner that will promote rather than impede managerial participation, (5) manipulation of data only when absolutely necessary and maintenance of tracking systems for the manipulation that does take place, and (6) avoidance of single-analysis systems for institutions with different roles and missions.

The community-college formula would appear to be under more pressure than the formulas for the four-year sector. Community-college enrollments are expected to grow in the state of Washington, but at a lower annual rate, as new student populations (returning women, older students, part-time students—particularly in vocational education) replace the declining numbers of traditional younger high-school graduates. Growth is not uniformly distributed, however, and some districts are basically static, with one or two experiencing enrollment declines. In addition, even in institutions where student numbers are stabilized, enrollments are shifting among programs, as one would expect, given the high premium placed by community colleges on responsiveness to community desires. This shift has led to an interest by the Board for Community College Education in at least partially separating funding from enrollment. If the community-college formula is to be examined from this perspective, cost information will be an important resource. A second pressure on the community-college formula is a desire for commonality between the community-college and baccalaureate formulas. The board has thus

far resisted such pressure based on an economy of scale argument. Half of the community colleges in the state have less than 3,000 FTE students. When vocational-, adult-, and developmental-education students are discounted, only 1,000 to 1,700 FTE students remain in the academic transfer programs, which are comparable to offerings in the lower division of the four-year institutions. This small enrollment raises a question about whether the community colleges can operate programs at the same student/faculty ratio as the larger four-year institutions. Since the cost study can provide the data necessary to analyze this question, it helps alleviate the pressure on the formula.

The Washington UES will probably continue to be a useful tool for state agencies to periodically assess the funding formulas, in spite of institutional criticism. However, further simplification of the procedures and data requirements is likely to occur. Indeed, several simplifications have been included in the guidelines for the 1978-79 cost study.

6

Wisconsin

Wisconsin's system of public postsecondary education consists of the University of Wisconsin System and the institutions operated by the Board of Vocational, Technical, and Adult Education. This case study deals only with the University of Wisconsin System. The System consists of 2 doctoral institutions (Milwaukee and Madison), 11 institutions in what is called the university cluster (Oshkosh, Eau Claire, Stevens Point, Whitewater, La Crosse, Stout, Platteville, River Falls, Parkside, Green Bay, and Superior), 14 two-year institutions treated collectively as the Center System, and University Extension, which is organized as a separate institution.

Madison is the original state university, founded in 1849. It is the land-grant institution and one of the nation's leading research universities. Milwaukee is an urban institution of almost 20,000 FTE students, offering a wide range of graduate and undergraduate programs. Parkside and Green Bay are smaller institutions founded by the University of Wisconsin to focus on undergraduate education. Green Bay, in particular, has a reputation for seeking alternative education styles. Oshkosh, Eau Claire, Stevens Point, Whitewater, La Crosse, Stout, Platteville, River Falls, and Superior were the Wisconsin State University System before the merger of the University of Wisconsin and the Wisconsin State Universities in 1971. Each of these universities evolved from state teachers colleges, which in turn evolved from county normal schools. The Center System offers two-year programs in *academic* areas (vocational programs are offered by the Board of Vocational,

Technical, and Adult Education), as well as transfer programs. The centers evolved from University of Wisconsin extension activities during the Depression and from branch campuses of the Wisconsin State University institutions.

At the state level, the Board of Regents is the single governing board for the University of Wisconsin System. It has a full range of governance responsibilities as well as statewide coordinating duties. Administratively, a policy of decentralized management is pursued, although the System office does not have a staff commensurate with its responsibilities. Wisconsin has an appropriations process with lump-sum (not distinguished by object of expenditure) appropriations. All legislative fiscal decisions are initiated by a Joint Committee on Finance. Wisconsin uses a biennial budget beginning in odd-numbered years. In even-numbered years, the legislature adjusts the budget as necessary.

Higher education has been funded in Wisconsin on a formula basis since 1953. At that time, the higher-education community was under the stress of an enrollment slump accompanying the Korean War and sought to regularize fiscal relationships with the state by means of a dollars-per-FTE student formula. This formula was based on average historical cost by function (instruction, student services, academic support, and so on), information that had been compiled by the University of Wisconsin since the 1930s. As the formula developed in ensuing years, differentiation by student level was added to the formula (with lower-division students being funded at a base rate, upper-division students at twice the base rate, and graduate students at 3.5 times the base rate). Finally, in 1971, differentiation by discipline was added to the formula.

The fiscal relationship between the University of Wisconsin and the state has been unstable during the 1970s. Fluctuations in state policy have combined with enrollment fluctuations to produce relative fiscal stringency at the University throughout the decade. By the 1971-73 biennium, the historical-average-cost formula had reached a high level of development, and most participants in the state budget process found it acceptable. This was also a biennium of enrollment downturn, which resulted in a decline in appropriations for the University of Wisconsin and prompted a number of second thoughts about the formula. By 1973-75, enrollments were back up. But economic difficulties being experienced by the state led to a 5 percent "productivity cut" and other fiscally restrictive measures, such as failure to fund increased graduate enrollments in the University of Wisconsin System. These restrictions offset the increased appropriations for additional undergraduate enrollments. In 1975-77, Wisconsin's enrollment-driven formula was suspended pending the development of a new formula that could accommodate a phasedown in University operations during the period of expected enrollment decline ahead. Since 1975-77 was another period of enrollment increase, the University of Wisconsin System again accommodated a large number of additional students (3,500 head count) without additional resources. Subsequently, a great deal of effort has been made to develop a budget formula that can cope with the expected enrollment decline without creating severe financial dislocation.

The Cost Study

Although cost studies of some sort have been conducted in Wisconsin since the 1930s, the cost analysis in its current form dates from 1971. Cost analysis in Wisconsin is a continuous process and covers a variety of areas. Costs are projected in each budget and monitored regularly throughout the budget period.

The Wisconsin cost analysis includes all current funds. However, a special focus on state general-purpose revenues and tuition revenues is used in Wisconsin's major formal cost study, the Cost Per Credit (CPC) calculation. This study is used to develop the biennial budget requests and will form the basis for the remainder of this description.

Wisconsin bases its cost analyses on the organizational structure of the campuses, on student level, and on student-major programs. The cost analyses conducted by the University of Wisconsin System have taken three basic forms: direct cost per credit of instruction, total cost per full-time-equivalent student according to student level, and direct cost of instruction by academic program. The most fundamental cost analysis is direct cost per credit. The other forms use direct cost per credit as the basic input.

The *direct cost per credit of instruction* is calculated for each budgetary entity (normally a department) that engages in credit instruction within an institution. The cost per credit then is summarized by organizational unit or budget categories to division (school or college), unit (university), and cluster (doctoral universities, nondoctoral universities, and two-year campuses) levels of aggregation. It is also summarized by academic-discipline grouping, from department to discipline areas (Social and Behavioral Sciences, Arts and Humanities, Engineering and Physical Sciences, Agriculture and Life Sciences, Non-Clinical Health Sciences, and Clinical Health Sciences), at the unit and cluster levels.

In order to calculate a departmental cost per credit of instruction by student level, the following components of information are required: (a) curricular data—the number of credits taught by student level within each course section, (b) budget data—the state General Purpose Revenue/Fees instructional budget, and (c) faculty data—the total salary of each state-funded instructional faculty member and the percentage of effort expended on each course section of instruction. The methodology differs from some approaches in that costs are allocated to course sections, using a faculty-effort analysis. Each member of the state-funded faculty who teaches one or more course sections reports the percentage of effort expended on each course section. The effort estimate is used to prorate the salaries of teaching faculty to each course section. These data are then assigned costs to levels of instruction, based on the distribution of student levels enrolled in a specific course section. Hence the direct cost per credit is based on *student level, not course level.*

Support salaries, supplies and expense budgets, and departmental and college costs are prorated by using the distribution of faculty salaries to arrive at total expenditures to support instruction. There is no attempt to prorate other activities,

such as academic support, student services, or institutional support. The uses of direct-cost-per-credit calculation are directly related to analysis of the instructional program, hence little is gained by adding support costs.

The *cost per student* is calculated from the direct cost per credit data. Four student levels—lower division, upper division, basic graduate, and advanced graduate—are used. Costs of medical students are determined by using a similar approach, applied to medical-school budgets. These are the cost elements included in the cost-per-student calculations:

- *Direct costs*—defined to include instruction, libraries, learning-resources media, instructional computing, and student services
- *Indirect costs*—including physical-plant operation and maintenance, general operations and services, teaching-assistant tuition remissions, and depreciation on instructional facilities

Using the cost ratios developed in the cost-per-credit methodology, costs are distributed on the basis of weighted student-credit costs for instruction, academic support, and tuition remissions. The costs of student services, general operations and services, and physical-plant operations and depreciation are distributed on the basis of average costs per student; that is, these costs are *not* weighted according to student levels. As already noted, the costs are developed using only state appropriations and student fees, since these cost data are used primarily in the state budgeting process.

The *direct cost per academic program* is calculated from data developed to calculate the cost per credit of instruction. This cost analysis is similar in approach to that developed by NCHEMS. Costs are aggregated from the individual course section, based on the majors of course enrollees. However, only average costs by instructional level for a department are used in assigning the cost to academic programs. For example, the average cost of lower-division instruction in the English department is used to determine the cost contribution of the English department to students majoring in biology. Both the cost per credit of given majors and the cost of an FTE within a major are calculated.

Wisconsin's cost study is well accepted at the institutional, system, and state levels. Participants in the budget process are confident of the cost study's ability to accurately calculate average costs of the three varieties noted above. Indeed, the perceived accuracy of the existing cost study is one reason that the executive branch is reluctant to develop alternative costing and budgeting techniques.

Use of Cost Information in the Budget Process

Cost information is used in Wisconsin's budget process for three major purposes: (1) setting tuition and fee levels, (2) allocating financial resources among institutions by the System, and (3) funding of the University of Wisconsin System as a whole by the state.

Student tuition and fee levels are established as a percent of total instruction-related costs. Fees for resident undergraduate students are set at 25 percent of average instruction and instruction-related costs for each cluster of universities in the System. That is, fees for students in the doctoral universities are established on the basis of average costs within the doctoral universities. Similarly, fees for students at the nondoctoral universities are set at 25 percent of average costs in these universities. Undergraduate nonresidents are charged 100 percent of instruction-related costs. Fees are 20 percent of cost for resident graduate students and 70 percent of cost for nonresident graduate students. The average cost per student by student level described earlier is used to set student fees and tuition. For a given year, costs are estimated on the basis of the budget established for that year and projected enrollments. Cost analyses have proved relatively stable from year to year. However, since differential fees are charged undergraduate and graduate students, an average of the ratios of costs by student level for the past three years is used in determining student fees.

Allocation of financial resources among institutions is the responsibility of the Board of Regents of the University of Wisconsin System. Further, the statutes merging the Wisconsin State Universities with the University of Wisconsin required the regents to review the equity of resources available to individual universities in the System. The charter statute and the mission statements of the System and universities emphasize diversity and differentiation. Faced with budget reductions and the possibility of future declines in enrollments, the System sought a method for reviewing the relative levels of resources among the universities that would not lead to homogenization of either programs or unit costs but at the same time would allow for maximum feasible institutional autonomy. The System needed an index of relative budget resources that reflected differences in programs and student profiles among the universities.

While no single index of institutional budget support is free of limitations, the University of Wisconsin System has developed the Composite Support Index (CSI) that takes into account several factors affecting the actual variance in instructional unit costs faced by universities. The CSI is essentially a weighted average cost per student credit hour (SCH). This index is calculated from the average cost per SCH for the six discipline areas and the four students levels *for each cluster* of institutions. The cost per SCH in each cell of this matrix is then indexed, with the aggregate cost for lower-division instruction being set at 100. This produces a weighting matrix similar to table 1, derived from a hypothetical example used by the University of Wisconsin. Additional adjustment factors are

TABLE 1

CLUSTER COST RATIOS BY DISCIPLINE CATEGORY AND STUDENT LEVEL

	Level 1	Level 2	Level 3	Level 4
Discipline Area A	.80	1.32	2.40	3.60
Discipline Area B	1.24	1.68	3.00	5.20
Discipline Area C	1.08	1.56	1.84	4.36
All Disciplines	1.00	1.60	2.72	4.64

developed to reflect the differential workload created by part-time students. For instructional activities, actual credit hours in each cell are adjusted by 10 percent of the difference between undergraduate FTE and head-count students and 5 percent of the difference between graduate FTE and head-count students. For Academic Support, Student Services, and General Operations and Services (Institutional Support), SCH in each cell are adjusted by 50 percent of the difference between undergraduate FTE and head-count students and 25 percent of the difference between graduate FTE and head-count students.

TABLE 2

	Weighted Student Credit Hours				
Instruction	**Level 1**	**Level 2**	**Level 3**	**Level 4**	
Discipline Area A	6,773	6,826	1,070	713	
Discipline Area B	4,743	6,717	546	343	
Discipline Area C	6,555	4,789	742	663	
	18,071 +	18,322 +	2,358 +	1,719 =	40,480

	Weighted Student Credit Hours				
Academic Support	**Level 1**	**Level 2**	**Level 3**	**Level 4**	
Discipline Area A	7,304	7,362	1,459	972	
Discipline Area B	5,115	7,244	744	468	
Discipline Area C	7,069	5,165	1,010	903	
	19,488 +	19,771 +	3,213 +	2,343 =	44,815

	Weighted Student Credit Hours				
Student Services	**Level 1**	**Level 2**	**Level 3**	**Level 4**	
Discipline Area A	9,130	5,577	608	270	
Discipline Area B	4,125	4,312	248	90	
Discipline Area C	6,545	3,311	549	207	
	19,800 +	13,200 +	1,405 +	567 =	34,972

	Weighted Student Credit Hours				
General Operations and Services	**Level 1**	**Level 2**	**Level 3**	**Level 4**	
Discipline Area A	9,130	5,577	608	270	
Discipline Area B	4,125	4,312	248	90	
Discipline Area C	6,545	3,311	549	207	
	19,800 +	13,200 +	1,405 +	567 =	34,972

Those calculations lead to four separate matrices of credit hours—one each for Instruction, Academic Support, Student Services, and General Operations and Services, and each adjusted for the difference in workload engendered by full- and part-time students. The matrices for Instruction and Academic Support are then multiplied by the instructional-cost-weighting matrix shown in table 1. The Student Services and General Operations and Services matrices are not further adjusted, because these costs are not felt to vary by discipline and level. This leads to a new set of weighted credit hours, as shown in table 2. Table 2 is again based on a hypothetical example used by the University of Wisconsin. The budget for each area is then applied to the weighted credit hours to produce the CSI, as shown in table 3. Again, table 3 is derived from the University of Wisconsin's hypothetical example. This method of calculation is used to produce the actual CSI value shown in table 4.

TABLE 3

Instruction	$1,305,000	÷ 40,480	=	32.24
Academic Support	$ 196,000	÷ 44,815	=	4.37
Student Services	$ 177,000	÷ 34,972	=	5.06
General Operations and Services	$ 205,000	÷ 34,972	=	5.86

The CSI is used in allocating resources among the institutions of the System. The use of a single index allows institutions the flexibility to establish priorities among academic programs and support services without being forced to conform to System norms. Thus diversity and program differentiation are encouraged among institutions with some confidence that total resources will be provided on an equitable basis.

The annual budget-planning process has sought to stabilize the resource-distribution pattern within a cluster by equalizing projected CSI values (after allowing for institutional differences and areas of distinction and innovation). In practice, this has meant establishing enrollment targets for institutions, based on institutional estimates of the number of students for which the institution has the capacity to provide a quality education. The enrollment targets were chosen so as to narrow the difference in CSI values within a cluster. As can be seen from table 4, the university-cluster CSIs for the 1976-77 target enrollments were clustered between 40.44 and 42.92. Exceptions were made for Green Bay and Superior because of their small size and enrollment problems and Green Bay's alternative education programs. It should be noted, however, that Green Bay and Superior were not simply grandfathered, but instead were expected to reduce their CSI values on a phased basis.

The regents of the University of Wisconsin System have established a policy of maintaining access to the University of Wisconsin System for all students who can benefit from a university education. This policy requires substantial resources, of course, to maintain quality academic programs for the large numbers of potential

TABLE 4

COMPOSITE SUPPORT INDEX

Institution	1972-73 Actual		1973-74 Actual		1974-75 Actual		1975-76 Actual		Targeted Capacity 1976-77	
	WSCH	CSI	WSCH	CSI	WSCH	CSI	WSCH	CSI	WSCH	CSI
Madison	1,787,215	32.33	1,758,961	34.35	1,828,012	35.38	1,902,972	36.60	1,916,605	36.39
Milwaukee	876,142	34.09	902,328	35.37	916,442	36.80	931,653	37.78	914,446	38.57
Oshkosh	414,818	35.04	366,599	38.92	366,154	40.34	385,593	39.38	381,654	40.44
Eau Claire	323,168	34.81	320,941	35.99	341,152	35.82	360,457	38.89	349,066	40.42
Stevens Point	315,384	34.72	289,394	36.96	287,466	38.13	298,726	40.24	297,760	40.43
Whitewater	314,258	35.42	276,263	38.32	268,365	39.87	290,493	40.42	288,686	40.83
La Crosse	256,977	35.41	251,290	36.64	259,615	38.07	266,981	40.29	265,296	40.75
Stout	224,788	36.41	213,664	40.62	226,778	40.01	239,485	41.23	240,437	40.82
Platteville	177,922	39.32	155,067	43.14	152,766	42.81	161,130	43.66	166,783	42.21
River Falls	154,528	39.97	145,388	42.33	150,425	43.29	160,166	43.17	165,169	41.92
Parkside	129,453	49.69	132,239	48.82	135,802	48.32	147,202	44.82	154,211	42.92
Green Bay	129,640	55.17	127,942	54.23	131,985	53.46	137,627	53.13	161,395	45.28
Superior	121,128	41.88	110,183	47.59	100,054	52.52	99,301	53.06	120,823	43.64
Center System	176,024	49.77	182,893	47.42	193,671	46.73	213,283	44.75	220,173	43.46

students in Wisconsin. To identify the level of funding needed, the System has worked with state government to develop a *funding formula* based on the following principles:

1. The formula should provide the regents with adequate state-fund resources on the basis of *System* need, to ensure access to the university System for all qualified applicants while sustaining programs of sound educational quality.
2. The formula must sustain diversity and flexibility in intrasystem and intra-university resource allocations, to facilitate the individual university's achievement of instructional and academic-support program goals and objectives.
3. While taking into account the nature and timing of the executive/legislative budget process, the formula must provide a reasonably stable planning and academic programming environment for the universities. In particular, it must minimize or avoid abrupt budget and staffing changes driven by short-term enrollment fluctuations.

The basic formula now used in Wisconsin is based on the *historical average cost per student credit hour,* as calculated by the cost study. SCH workload changes and unit costs are determined by discipline grouping and student level—for example, lower-division instruction in arts and humanities. The same four student levels used in the cost study—lower division, upper division, master's specialist, and doctoral—are used in the formula. The formula uses six discipline categories—social and behavioral sciences, arts and humanities, agriculture and life sciences, engineering and physical sciences, nonclinical health sciences, and clinical health sciences. Funding for law and medicine is provided on the basis of average cost per head-count student, since for these highly structured programs there is little difference between head-count and full-time students.

Projected changes in student-credit-hour workloads for the regular academic year and summer sessions are calculated for each student level and discipline category at each university in the System. Average costs per SCH applied to the changes in workload are summed to arrive at the incremental funding required for the instructional programs. Instructional funding for the total System is calculated according to the following formula:

$\$ = \sum {}^{c}i_{j} \, {}^{w}i_{j}$ where ${}^{c}i_{j}$ is the cost per credit in discipline category i and level j and ${}^{w}i_{j}$ is the projected change in annual student credits in discipline category i and level j.

This formula is used only to fund enrollment change. It is *not* used to analyze the base budget.

Funding adjustments for academic support (libraries, media, and instructional computing) and student services are determined by an allowance equal to the percentage relationship of these program costs to instructional costs. Other cost areas,

such as General Operations and Services, are not adjusted for enrollment changes—that is, they are treated as fixed costs.

During the 1977-79 biennium, two refinements were made to the basic formula shown above. They were intended to make the formula more accurately reflect the resource needs of the UW System and to facilitate System planning processes. These refinements are (1) the use of a *rolling five-year average* of actual (two years) and projected (three years) SCH workload, to dampen the budgetary effects of short-term enrollment fluctuations, and (2) the adjustment of unit costs to reflect economies of large scale or diseconomies of small scale associated with varying enrollment levels among the universities of the System and the application of the concept of fixed and variable costs.

The first of these refinements is self-explanatory. By dampening the effects of short-run enrollment fluctuations, the formula allows the System to project budget levels with some confidence and supports more useful financial planning. The second refinement defines certain types of costs as fixed (and thus excluded from the annual budget adjustment for enrollment change.) As already noted, a substantial portion of System expenditures on such things as Physical Plant and General Operations and Services were already defined as fixed costs in the old formula and excluded from the enrollment formula.

In the instructional area, it is assumed that all *direct* classroom teaching costs are variable at the System level (although not necessarily at lower levels of aggregation) and thus should be included in the enrollment formula. Some instructional costs that are not direct classroom costs are considered fixed.

Among the two budget activities covered by the funding formula, judgments about instructional costs are the most difficult to make. Adding a given number of students may impose no additional direct resource requirements (more class sections or more faculty or both), provided that present class sizes are less than optimal capacity determined in relation to campus- and program-specific educational and cost standards. However, in current conditions, it is probable that a variety of classes are operating at *or above* their individual capacities for quality education and that small enrollment increases could require resources costing even more than the average cost per student. The net fiscal effort of these factors cannot be specifically identified.

Certain *indirect* college and departmental costs in the instructional activity are defined as being independent of enrollments. Thus the salaries of deans, associate and assistant deans, directors, and various related staff are defined as fixed, because their functions are to a large extent essential regardless of enrollment variations. In addition, an amount equal to 100 percent of dean and director salaries is identified as assignable to the salary and nonsalary support of those fixed functions. Further, part-time departmental chairpersons are required. After a survey of smaller campuses, a 30 percent contribution of the average associate professor's salary was defined as the fixed chairperson cost (released time) for each department. The salary of a half-time typist is added. Supply and capital costs are computed at

25 percent of the fixed unclassified and classified salaries. According to these determinations, about 10 percent of the total System Instruction budget is a fixed cost.

The fixed portion of the Student Services budget is defined as positions necessary for the operation of the student-affairs function and normally budgeted as dean, associate or assistant dean, and associate or assistant director positions (for example, director of admissions, registrar, vice-chancellor or dean of student affairs). Fixed support costs (clerical, supplies, capital) are assumed to equal the salary costs of fixed dean and director positions. About 40 percent of the System's Student Services budget is defined as a fixed cost.

Definitions similar to those applied to Student Services were used to identify fixed academic-support costs. The fixed-cost definition was expanded to identify the additional costs to maintain an opening-day library collection and minimal computing-service core for a small university. The basic book collection is assumed to be 85,000 volumes—a figure derived from the formula used by the state of Washington. The costs of maintaining the collection include the salaries of about four professional and four classified staff and a capital budget (about $183,000 in 1976-77 dollars) for a 10 percent acquisitions/replacement rate to maintain and update the collection. The fixed portion of computer costs in addition to director positions was defined by averaging the supplies and capital costs of three small universities considered to have about the minimum module of service. About 35 percent of the System's budget for Academic Support is defined as a fixed cost.

Overall, the fixed costs of Instruction, Academic Support, and Student Services are about 14 percent of the cost base for the state funding formula. These fixed-cost exclusions are in addition to General Operations and Services and Physical Plant costs, which represent 22 percent of the System's cost per student. The total fixed-cost exclusion is 36 percent of the total state-supported budget. The 64 percent of the budget that is considered variable is adjusted on a pro rata basis for enrollment increases or decreases, according to the basic formula described earlier.

Future Prospects

The University of Wisconsin System will almost certainly continue the state's long practice of conducting cost studies and using cost analyses for decisionmaking. Staff at all levels use cost information with confidence and are convinced of the *technical* integrity of UW's cost analyses. Therefore Wisconsin is likely to continue to collect historical cost information, probably on the basis of average unit costs. Wisconsin has shown a capacity to continually improve the accuracy and consistency of cost information, and probably refinements also will continue.

How the policy implications of the cost information will be used is another question. The Composite Support Index seems to have become something of a

tradition for monitoring allocation of resources among institutions. The UW System has confidence in the CSI as an indicator of relative support for different campuses. CSI values for different campuses are widely known and discussed, and executive and legislative staffs regularly use CSI values in their studies. The use of CSI seems assured for allocation of resources within the System. But the policy implications of different CSI values for different campuses are unclear. The UW System has recognized the small size and unique missions of several campuses by allowing their CSI values to exceed those of the rest of the System. As enrollments decline and shift during the next decade, it will become harder and harder to keep CSI values in the same general range for all institutions.

Although the CSI calculation itself takes into account the program and level differences among institutions, the differential CSI values allowed for the smaller campuses are already being questioned by UW–Madison, and as the differences become larger and the fiscal environment more restrained, resentment will likely develop. Whether this resentment can become a political force is not known, but the possibility certainly exists. One possible consequence would be the temptation of the executive and legislative branches to intervene in the allocation of resources so as to ameliorate the political consequences. This, of course, would change a fundamental policy of the state that reserves allocation decisions for the regents. But unless the larger campuses can be convinced that differential CSI values are fair, the change in policy could come about.

Instability may continue regarding the state funding formula, which has been in suspension or under major revision for the past two biennia. This situation continues during the current biennium. The UW System is seeking to refine the definition of fixed costs and thus change the proportion of the budget excluded from annual enrollment adjustments. For the enrollment pattern expected for the next decade, this will have the effect of smaller reductions in UW's budget. The UW System is concentrating on the instruction function in its effort to identify more fixed costs. As enrollments decline in the 1980s, the loss of students of traditional college age will be partly made up by older students, many of them attending part-time. The UW System believes that in order to effectively serve these students, it will be necessary to offer sections at different times and places than has been customary. This will create a requirement for more class sections for a given course structure and FTE enrollment level and thus raise the institution's fixed costs. A second important factor is the establishment of the minimum fixed costs of instruction even for full-time students. The existing formula regards only academic administration and similar activities as a fixed cost of instruction, not any direct classroom teaching cost. As enrollment declines further, several institutions will be reduced to the budget levels necessary to support a minimum curricular mix, and conceivably below that level, if the present formula is continued. For example, 90 percent of the offerings at UW–Superior are single-section courses. Alternatively, the smaller institutions could continue to be protected by

reallocation of resources within the UW System. Because neither alternative is attractive to the System, the current effort is being made to revise the formula.

The ultimate results of this effort are uncertain. Both the executive and legislative branches accept the theory of fixed costs and support the effort to conduct further research in the area. They are reserving judgment on any specific redefinition of fixed costs. Much will depend on the resolution of policy issues that are outside the narrow confines of costing theory.

7

Assessment

It is difficult to generalize about conditions in four different states with different circumstances affecting different kinds of educational systems. We do believe, however, that several common threads exist and that several general lessons can be learned. The conclusions that we draw do not relate to specific cost technologies or formula factors—the states were too diverse for that. Rather, our assessment relates to general approaches to developing costing techniques and budget formulas for the 1980s.

The first point is that in order to develop new budgeting approaches for the 1980s, there must be an impetus for change. Conditions need to be significantly different than those existing in the 1950s, 1960s, and 1970s, when the existing formulas were developed and refined. In Wisconsin and Indiana, changes in conditions are clearly evident. Both states are expecting large enrollment declines, approaching 30 percent by their own estimates. The potential for financial dislocation created by this kind of enrollment decline has led to the use of what is described as a marginal-cost formula in Indiana and the development (with further work under way) of a fixed-and-variable-cost formula in Wisconsin. In Washington, on the other hand, there is no significant impetus for change. Large changes from the enrollment levels of the 1970s are not expected to occur, and so the state of Washington is able to afford a go-slow approach in changing the formula. While Washington knows that an average-cost formula does not accurately reflect the financial conditions faced by institutions, it is willing to wait for more conclusive

evidence about actual cost behavior than currently exists before making significant changes. In addition, only the formula for the Instruction Program is directly related to FTE student enrollment; formulas for Plant Operation and Maintenance and Libraries are not enrollment sensitive, while Student Services is related to head-count enrollment. In Florida, the impetus for change did not come from predictions of a large enrollment decline and resultant financial dislocation, but rather from an intellectual desire on the part of the professional staff and elected officials to improve the formula. In spite of the lack of any clear environmental reasons for change, the Florida proposal came close to passage by the legislature—a few changed votes in one house of the legislature would have made the difference. The question of the Florida fixed-and-variable-cost formula is not closed—its passage and implementation may yet occur. We concede that Florida is an unusual case, both because of the large professional staffs supporting political decision-makers and the high degree of cooperation evident throughout the community-college budget process.

Once the impetus for change is present, some difficult choices need to be made. One of the perennial dilemmas in developing funding formulas is the trade-off that must be made between accuracy and simplicity. For formulas to be acceptable, they must be a reasonably accurate reflection of reality. Many formulas thus take into account legitimate differences among institutions—programs offered, level of students, prevailing wage rates, and so on. But the more accurately a formula represents a complex enterprise, the more complex the formula becomes. This violates the political requirement that formulas be easily understood. This dilemma has proved impossible to completely resolve, even with respect to the relatively simple average-cost formulas used in the past.

The desire to develop new formulas that will serve better during a period of declining enrollments is essentially a desire for more accuracy in the formulas. The new formulas adopted in the states we have studied are thus a great deal more complex than the formulas they replaced. We believe that this will hold true wherever attempts are made to adjust to declining enrollments (short of abandoning formulas and maintaining funding at existing levels or substantially enriching average cost formulas). The complexity of formulas probably will increase, whether or not they are of the fixed-and-variable-cost type studied here. Since a price will have to be paid with respect to simplicity, it is vital that concensus and understanding be sought in the early stages of any revision process.

The three states that developed new types of formulas showed two distinct patterns. Florida and Wisconsin chose a relatively detailed approach and sought to use available empirical data supplemented by informed judgment to separate costs that are fixed regardless of enrollment levels (within a reasonable range) from those that vary as enrollments change. In some cases, this has meant stretching the cost data beyond what they could conclusively support; however, the results have been formulas that make intuitive sense and will be relatively easy to modify as experience accumulates. Indiana, on the other hand, opted for a much simpler

formula. It has the advantage of being more easily explainable in general terms, but no additional level of detail is available for further explanation. Ironically, Indiana conducted what was probably the most rigorous cost analysis of any of the four states but felt that since fixed and variable costs could not be definitively separated, a simpler approach was preferable.

Although only time will tell with any certainty which approach is more desirable, we feel that the fixed-and-variable-cost approach taken in Florida and Wisconsin is probably more promising. Historically, formulas have reflected a strong normative assumption about what costs should be, and the advent of new types of formulas is not likely to change this. The approach in Florida and Wisconsin thus is part of a long tradition of normative costing—based on actual cost data but including a number of judgments. Among the advantages of this detailed normative approach are (1) the ease of modifying individual formula elements as experience about actual cost behavior accumulates, without creating a totally new formula; (2) the intuitive nature of the detailed components of the formula; (3) the possibility of empirically verifying individual formula elements; and (4) the availability of varying levels of detail.

In the Indiana approach, however, additional experience about cost behavior cannot explicitly be incorporated without changing the entire foundation of the marginal-cost factors. This is mitigated by the fact that the marginal-cost factors play a relatively small role in the total formulation of budget levels. The bulk of the budget is determined by a cost-study-driven average-cost formula. Thus, many of the changes in actual cost behavior will be automatically incorporated in the base budget *before* the marginal-cost factors are applied. A second problem is that the empirical base of the marginal-cost factors is not linked to the Indiana cost study. (It cannot be expected that other states seeking to use the same approach could do any better, given Indiana's sophistication in using cost information.) Finally, the Indiana marginal-cost factors are one-dimensional—no additional supporting arguments for the factors are available for those who seek them. If the results of the formula begin to diverge from the expected results, the marginal-cost factors will be put under severe pressure, and no readily available supporting arguments will be available. Certain technical features may well cause the Indiana formula to diverge from expected results. Among these are the assumption that costs behave the same during growth as in decline, the marginal-cost factor's failure to deal with accumulated (rather than year-to-year) change in enrollments, and the fact that larger enrollment changes lead to proportionally larger financial changes. In this situation, we believe that the stresses may tend to accumulate rather than be relieved by incremental change, until finally the Indiana formula will have to be totally rebuilt.

Despite our criticism of Indiana's approach, we think that it has several major advantages over the approach in Florida and Wisconsin. The simplicity of the formula allows it to be readily explained to the political authorities and the public. The advantages of this should not be underestimated. In addition, the simplistic

methodology of the Indiana formula effectively prevents state-level intervention in the internal affairs of the institution (at least interventions based on the formula). In Florida and Wisconsin, on the other hand, the detail included in the formula and the intuitive nature of the formula factors may invite such intervention. Certain technical features of the Indiana formula are also valuable. First, Indiana's marginal-cost factors assume that the marginal cost is not constant (that is, it differs for different changes in enrollment levels, while the Wisconsin/Florida approach assumes that marginal costs are constant. The latter approach is consistent with a straight-line cost function. Since constant marginal costs are unlikely, the Indiana approach is theoretically more accurate, although a straight line may be a better approximation of the actual cost function than is the curve produced by the Indiana factors. Another important technical feature of the Indiana formula is its self-correcting nature. Since Indiana uses the cost figures for individual institutions (that is, it does not use statewide averages) to build budgets, the cost experience of the prior year will automatically be built into the budget base. This is, however, a double-edged sword, as many factors that are not well understood can affect cost behavior and thus the budgets.

In summary, we believe that the balance between simplicity and accuracy will necessarily shift toward accuracy during the coming years. When enrollments were rising and resources were relatively plentiful, the advantages of simple formulas were at their strongest and their disadvantages relatively unimportant. With enrollments and resources declining, some of the trade-offs favoring simplicity will become politically impossible. Institutions will not be willing to accept the perceived inadequacies of simple formulas without the incentive of ever-increasing resources. The equity arguments that lead to accurate but complex formulas will become much more intense as financing becomes more restrictive. The quest for simplicity, of course, should not be abandoned, but rather, the balance point should shift. It appears to us that the Florida approach of a very complex analysis linked to a relatively simple formula has a great deal to recommend it.

If the option of accurate but complex formulas is chosen, the experience reflected in the case-study states shows the importance of extensive communication among the staffs of key state agencies. This was particularly evident in Florida, where the effort to develop a new formula had the active support of most key participants. Although the formula was not implemented, it is significant that the effort almost succeeded, in spite of the lack of a large enrollment problem. In Indiana, communication was also a key factor. Although Indiana lacks the large staffs found in other states (Indiana has a very small legislative fiscal staff as well as a small executive budget agency), the deliberative process appeared to be very open and enjoyed the support of a key legislator.

One important advantage of open communication relates to the circumstances surrounding the implementation of a new formula. It is important that the post-secondary-education community should approach the political authorities as soon as a problem is perceived and seek to deal with it cooperatively. Where it is still

possible, the new formula should be implemented as enrollments are still rising (or at least stable and shifting to higher-cost programs). This restraint is essentially a *quid pro quo* for cooperation in maintaining *essential* capacity during times of enrollment decline. The usefulness of this pattern was evident in both Wisconsin and Indiana. In Wisconsin, it was stated that much depended on the perceptions of the *motives* of the University of Wisconsin System rather than on any cost analysis. In Indiana, it was widely felt that convincing the legislature of the relevance of the marginal-cost *theory* when enrollments were still rising was of great importance.

When we advocate the development of relatively complex, accurate formulas, we use the term *accurate* advisedly. The experiences of the case-study states indicate clearly that a great deal remains to be discovered about the actual cost behavior of postsecondary-education institutions. When we remember that the case-study states were chosen on the basis of their sophistication in dealing with cost information, the lack of definitive information on fixed and variable costs becomes even more striking. The reasons for this shortcoming are lack of significant research until recently and the relationship of costs to environmental and decision factors, as well as to volume factors. While the approach taken in Wisconsin and Florida shows a great deal of promise, it will require constant monitoring and reevaluation before confidence can be expressed in the link between formula factors and actual cost behavior. In this regard, the integration of decision factors, as well as volume and environmental factors, into the cost estimate will inevitably become a major issue. States have always made some of the decisions about postsecondary-education expenditures. But the more complex formulas we envision and the closer simulation of actual cost behavior in funding formulas may well create a state role in decisions that has hitherto been the province of institutional decisionmakers.

To sum up, we feel that mechanisms for the allocation of resources to and within postsecondary education need to be developed further. We think that in the past, formulas have shown utility for focusing state attention on financing problems and that formulas will not disappear as long as state political authorities perceive them as useful. The task then is to develop new formulas that allow institutions to adjust to an environment of declining enrollments and that do not have *unintended* educational implications. We believe that the fixed-and-variable-cost formulas developed by Wisconsin and Florida, while not a panacea, show significant promise for accomplishing their objectives.